xtstreg postestimation — Postestimation tools for xtstreg

Postestimation commands	predict	margins	Remarks and examples
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Postestimation commands

The following postestimation command is of special interest after xtstreg:

Command	Description
stcurve	plot the survivor, hazard, and cumulative hazard functions

The following standard postestimation commands are also available:

Description	
contrasts and ANOVA-style joint tests of parameters	
Akaike's, consistent Akaike's, corrected Akaike's, and Schwarz's Bayesian infor- mation criteria (AIC, CAIC, AICc, and BIC, respectively)	
summary statistics for the estimation sample	
variance-covariance matrix of the estimators (VCE)	
cataloging estimation results	
table of estimation results	
Hausman's specification test	
point estimates, standard errors, testing, and inference for linear combinations of parameters	
likelihood-ratio test	
marginal means, predictive margins, marginal effects, and average marginal effects	
graph the results from margins (profile plots, interaction plots, etc.)	
point estimates, standard errors, testing, and inference for nonlinear combinations of parameters	
linear predictions and their SEs, means, medians	
point estimates, standard errors, testing, and inference for generalized predictions	
pairwise comparisons of parameters	
Wald tests of simple and composite linear hypotheses	
Wald tests of nonlinear hypotheses	

predict

Description for predict

predict creates a new variable containing predictions such as linear predictions, mean and median survival times, hazard functions, and standard errors.

Menu for predict

Statistics > Postestimation

Syntax for predict

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

statistic	Description	
Main		
xb	linear prediction; the default	
mean	marginal mean survival time	
mean0	mean survival time assuming that the random effects are zero	
median0	median survival time assuming that the random effects are zero	
hazard	marginal hazard	
hazard0	hazard assuming that the random effects are zero	
surv	marginal predicted survivor function	
surv0	predicted survivor function assuming that the random effects are zero	
stdp	standard error of the linear prediction	

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.

mean calculates the mean survival time that is marginal with respect to the random effect, which means that the statistic is calculated by integrating the prediction function with respect to the random effect over its entire support.

meanO calculates the mean survival time assuming that all random effects are zero.

median0 calculates the median survival time assuming that all random effects are zero.

hazard calculates the hazard function at _t0 that is marginal with respect to the random effect, which means that the statistic is calculated by integrating the prediction function with respect to the random effect over its entire support.

hazard0 calculates the hazard function at _t0, assuming that all random effects are zero.

surv calculates the predicted survivor function at _t0 that is marginal with respect to the random effect, which means that the statistic is calculated by integrating the prediction function with respect to the random effect over its entire support.

surv0 calculates the predicted survivor function at _t0, assuming that all random effects are zero.

stdp calculates the standard error of the linear prediction.

nooffset is relevant only if you specified offset(*varname*) with xtstreg. This option modifies the calculations made by predict so that they ignore the offset variable; the linear prediction is treated as $\mathbf{x}_{ij}\beta$ rather than as $\mathbf{x}_{ij}\beta$ + offset_{ij}.

margins

Description for margins

margins estimates margins of response for linear predictions and mean and median survival times.

Menu for margins

Statistics > Postestimation

Syntax for margins

argins [marginlist] [, options]	
argins [marginlist], predict(statistic) [predict(statistic)] [option	ns]

statistic	Description
mean	marginal mean survival time; the default
mean0	mean survival time conditional on zero random effects
median0	median survival time conditional on zero random effects
hazard	marginal hazard
surv	marginal predicted survivor function
xb	linear predictor for the fixed portion of the model only
hazard0	not allowed with margins
surv0	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.

Remarks and examples

Example 1

In example 1 of [XT] **xtstreg**, we analyzed the time to infection of the catheter-insertion point for 38 kidney dialysis patients. We fit the following model:

```
. use https://www.stata-press.com/data/r19/catheter
(Kidney data, McGilchrist and Aisbett, Biometrics, 1991)
. xtset patient
(output omitted)
. xtstreg age female, distribution(weibull)
(output omitted)
```

The predict command allows us to compute the marginal mean and the mean and median survival time assuming that all random effects are zero:

- . predict mean, mean
- . predict mean0, mean0
- . predict median0, median0

Here we list the predicted mean and median survival times for the first five patients:

	patient	mean	mean0	median0
1.	1	60.97527	40.39634	32.34459
2.	1	60.97527	40.39634	32.34459
3.	2	204.0082	135.1562	108.217
4.	2	204.0082	135.1562	108.217
5.	3	59.56653	39.46305	31.59731
6.	3	59.56653	39.46305	31.59731
7.	4	224.6581	148.8368	119.1708
8.	4	224.6581	148.8368	119.1708
9.	5	67.7384	44.87694	35.93212
10.	5	67.7384	44.87694	35.93212

. list patient mean mean0 median0 in 1/10, sepby(patient)

This example illustrates that for nonlinear models, the mean computed with the random effects equal to zero is usually not representative of the marginal mean.

predict can also compute the predicted survivor function and the predicted hazard function. All of these predictions can be marginal or conditional on the random effects being zero.

Predicted survivor, failure, hazard, or cumulative hazard functions can be visualized with stcurve. For example, below we compute marginal predictions for the survivor function for men and women at age 50.

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The graph above shows that women who are 50 years old have larger survival probabilities than men of the same age.

Methods and formulas

predict newvar computes the following predictions: mean0:

$$\textit{newvar}_{ij} = \int_0^\infty \hat{S}(t|\mathbf{x}_{ij}, u_{ij}) dt$$

median0:

$$newvar_{ij} = \{t : \hat{S}(t|\mathbf{x}_{ij}, u_{ij}) = 1/2\}$$

surv0:

$$newvar_{ij} = \hat{S}(t_{ij} | \mathbf{x}_{ij}, u_{ij})$$

hazard0:

newvar_{ij} =
$$\hat{g}(t_{ij}|\mathbf{x}_{ij}, u_{ij})/S(t_{ij}|\mathbf{x}_{ij}, u_{ij})$$

Here $\hat{S}(t|\mathbf{x}_{ij}, u_{ij})$ is the survivor function $S(t|\mathbf{x}_{ij}\boldsymbol{\beta} + u_{ij})$, and $\hat{g}(t|\mathbf{x}_{ij}, u_{ij})$ is the density $g(t|\mathbf{x}_{ij}\boldsymbol{\beta} + u_{ij})$ with the parameter estimates substituted in for $\boldsymbol{\beta}$ and zero substituted for u_{ij} .

Also see

[XT] xtstreg — Random-effects parametric survival models

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- [ST] stcurve Plot the survivor or related function after streg, stcox, and more
- [U] 20 Estimation and postestimation commands

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