Statistics/Data Analysis

help LRE

Title

LRE —— Linear Rank estimator

Syntax

LRE *varlist* [*if*] [*in*] **, pars(***namelist***) instr(***varlist***) start(***varname***) end(***varname***) fail(***varname***) id(***varname***) method1(***string***) method2(***string***) [nointermed intermedflnm(***string***) dirmatpow(***namelist***) weightmat(***namelist***) displaydistu(***integer***) tolpowell(***real***) tolpbrent(***real***) deltanm(***real***) maxitnr(***integer***) maxit(***integer***)]

Description

LRE computes the Linear Rank estimator for an Mixed Proportional Hazard model with piecewise constant duration dependence (baseline hazard) (intervals should be included in the covariates and the instruments: see "An introduction to survival analysis using STATA" , Cleves et al.) and variables, *varlist* based on the starting values *pars*. The starttime *start*, endtime *end* and the failure indicator *fail* are based on stset. *id* is the multiple record (always present for piecewise constant baseline hazard). The Linear Rank estimation method starts with a rootfinding method, *method1* for non-differential multivariate functions, either *Powell* or *NM* (Nelder-Mead), and then alternates to the other method *method2*. Because very often even alternating does not lead to a solution of the linear rank function, the LRE method then uses a pseudo Newton-Raphson method for *maxitnr* times and returns to the Powell/Nelder-mead iterating procedure, till convergence. Convergence is tested by calculating the values of the linear rank function in a coefficient vector with values 1e-4 smaller and 1e-4 larger. When the sign of all changes for all coefficients the optimum value has been found. Note that the instruments in *instr* are equal to all variables (and the all but one of the piecewise constant interval indicators).

Options

nointermed specifies that the intermediate (after each method switch) coefficient values are not saved.

intermedflnm specifies *filename* in which intermediate (after each method switch) coefficient values are saved.

dirmatpow specifies the starting direction matrix of the Powell method (only used in Powell method) with # cols = # rows = # included covariates.

weightmat specifies a weight matrix for the linear rank function, i.e. minimizes S'WS instead of S'S

displaydistu(*integer***)**specifies whether the estimated distribution of U is displayed, 1 display and 0 (default) do not display

tolpowell(*real***)** convergence tolerance for Powell method, default=1e-8

tolbrent(*real***)** convergence tolerance for brent method (used in Powell method), default=1e-8

deltanm Specifies simplex delta vector for Nelder_Mead method, default= (1,..1). Can also provide a scalar, then simplex delta vector becomes (deltanm,...,deltanm)

maxitnr(*integer***)** maximum number of iterations of Pseudo Newton-Raphson procedure, default = 10

maxit(*integer***)** maximum number of iterations between Powell and Nelder-Mead procedure, default = 100

Remarks

Need to *stset* the data first. Then remove all data with _st==0.

LRE saves the following in **e()**:

Scalars

e(N)	number of observations
e(maxitNR)	maximum number of iterations of Pseudo Newton-Raphson procedure
e(maxit)	maximum number of iterations between Powell and Nelder-Mead procedure
e(num_alt_iter)	number of iterations between Powell and Nelder-Mead procedure
e(TolPowell)	covergence tolerance of Powell method (only for Powell method)
e(TolBrent)	covergence tolerance of Brent method (only for Powell method)
e(check)	covergence test, 1 if converged, 0 not converged

Macros

e(cmd)	**LRE**
e(xvars)	name(s) of included covariate(s)
e(instruments)	instruments
e(ID)	individual ID
e(method1)	either Powell or Nelder-mead (NM)
e(method2)	either Powell or Nelder-mead (NM)

Matrices

e(b)	coefficient vector
e(V)	variance-covariance matrix of the estimators
e(Slre)	value linear rank-function at optimum
e(V_S)	variance-covariance linear rank-function
e(Q)	Q-matrix of linear rank-function, see Bijwaard (2009)
e(S_check)	value linear rank-function at optimum for coefficient values 1e-4 larger and 1e-4 smaller. Convergence reached if sign change
e(ParsU)	coefficients of discrete mixture distribution of U in optimum
e(Weight)	matrix of weights

Functions

e(sample)	marks estimation sample

Example

```
.run create_LRE_mlib
.mata: mata mlib index
.use LRE_sample_dat
.stset t1, fail(event) id(ID) exit(time .)
.gen byte int_2 = (_t0==5)
.gen byte int_3 = (_t0==20)
./*** initial estimation using streg ***/
.streg x0 x1 int_2 int_3, dist(exp) frailty(gamma) shared(ID) nohr
.matrix bgam = e(b)
.matrix pars0 = bgam[1,"_t:x0".."_t:int_3"]
.matrix deltanmMat = (0.2,0.2,0.5,1)
.matrix DirPow = 10*I(4)
.LRE x0 x1 int_2 int_3, pars(pars0) instr(x0 x1 int_2 int_3 ) ///
.  start(_t0) end(_t) fail(_d) id(ID) method1(NM) method2(Powell) ///
.  nointermed deltanm(deltanmMat) dirmatpow(DirPow)
```

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