Statistics/Data Analysis

Title

rdbwdensity —— Bandwidth Selection for Manipulation Testing using Local–Polynomial Density Estimation.

Syntax

rdbwdensity *var* [*if*] [*in*] [**, c(***#***) p(***#***) kernel(***kernelfn***) fitselect(***fitmethod***) vce(***vcemethod***)**]

Description

rdbwdensity implements several data–driven bandwidth selection methods useful to construct manipulation testing procedures using the local polynomial density estimators proposed in Cattaneo, Jansson and Ma (2019).

This command is used by rddensity.

A detailed introduction to this Stata command is given in Cattaneo, Jansson and Ma (2018).
Companion R functions are also available here.

Related Stata and R packages useful for inference in regression discontinuity (RD) designs are described in the following website:

https://sites.google.com/site/rdpackages/

Options

c(*#***)** specifies the threshold or cutoff value in the support of in *indepvar*, which determes the two samples (e.g., control and treatment units in RD settings). Default is **c(0)**.

p(*#***)** specifies the order of the local–polynomial used to construct the density estimators. Default is **p(2)** (local quadratic approximation).

fitselect(*fitmethod***)** specifies the order of the local–polynomial used to construct the bias–correction for the density estimators. Options are:
unrestricted for density estimation without any restrictions (two–sample, unrestricted inference). This is the default option.
restricted for density estimation assuming equal c.d.f. and higher–order derivatives.

kernel(*kernelfn***)** specifies the kernel function used to construct the local–polynomial estimator(s). Options are: **triangular**, **epanechnikov**, and **uniform**. Default is **triangular**.

vce(*vcemethod***)** specifies the procedure used to compute the variance–covariance matrix estimator. Options are:
plugin for asymptotic plug–in standard errors.
jackknife for jackknife standard errors. This is the default option.

Example: Cattaneo, Frandsen and Titiunik (2015) Incumbency Data.

Load dataset (cutoff is 0 in this dataset):
. use rddensity_senate.dta

Bandwidth selection for manipulation test using default options:
. rdbwdensity margin

Bandwidth selection for manipulation test using plug–in standard errors:
. rdbwdensity margin, vce(plugin)

Saved results

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

Macros

e(c)	cutoff value
e(p)	order of the polynomial used for density estimation
e(N_l)	sample size to the left of the cutoff
e(N_r)	sample size to the right of the cutoff
e(h)	matrix of estimated bandwidth (including underlying estimated constants)
e(runningvar)	running variable used
e(kernel)	kernel used
e(fitmethod)	model used
e(vce)	standard errors estimator used

References

Cattaneo, M. D., Frandsen, B., and R. Titiunik. 2015. Randomization Inference in the Regression Discontinuity Design: An Application to the Study of Party Advantages in the U.S. Senate.
Journal of Causal Inference 3(1): 1–24.

Cattaneo, M. D., Michael Jansson, and Xinwei Ma. 2018. Manipulation Testing based on Density Discontinuity.
Stata Journal 18(1): 234–261.

Cattaneo, M. D., Michael Jansson, and Xinwei Ma. 2019. Simple Local Polynomial Density Estimators.
Journal of the American Statistical Association, forthcoming.

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