STaTa®

Statistics/Data analysis

Title

rdsensitivity ─── Sensitivity analysis for RD designs under local randomization.

Syntax

rdsensitivity *outvar runvar* [*if*] [*in*] [, **cutoff(**#**) wlist(***numlist***)
    wlist_left(***numlist***) tlist(***numlist***) statistic(***stat_name***) p(**#**) evalat(***point***)
    kernel(***kerneltype***) fuzzy(***fuzzy_var [fuzzy_stat]***) ci(**# #**) ci_alpha(**#**) reps(**#**)
    seed(**#**) saving(***filename***) nodots nodraw verbose**]

Description

rdsensitivity performs sensitivity analysis for regression discontinuity designs
    (RD) under local randomization. See <u>Cattaneo, Frandsen and Titiunik (2015)</u> and
    <u>Cattaneo, Titiunik and Vazquez-Bare (2017)</u> for an introduction to this
    methodology.

A detailed introduction to this command is given in <u>Cattaneo, Titiunik and
    Vazquez-Bare (2016)</u>.
    Companion <u>R</u> functions are also available <u>here</u>.

Companion functions are <u>rdrandinf</u>, <u>rdwinselect</u> and <u>rdrbounds</u>.

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

    <u>https://rdpackages.github.io/</u>

Options

cutoff(#**)** specifies the RD cutoff for the running variable *runvar*. Default is
    cutoff(0).

─────┘ Window and TE lists └─────────────────────────

wlist(#**)** specifies the list of window limits to the right of the cutoff. By
    default the program constructs 10 symmetric windows around the cutoff, the
    first one including 10 treated and control observations and then adding 5
    observations to each group in subsequent windows.

wlist_left(#**)** specifies the list of window limits to the left of the cutoff. When
    not specified, the command uses symmetric windows around the cutoff based on
    wlist().

tlist(#**)** specifies the list of null values for the treatment effect. By default
    the program employs ten evenly spaced points within the asymptotic confidence
    interval for a constant treatment effect in the smallest window to be
    employed.

─────┘ Statistic └─────────────────────────

statistic(*stat_name***)** specifies the statistic to be used. Options are:
    diffmeans for difference in means statistic. This is the default option.
    ksmirnov for Kolmogorov-Smirnov statistic.
    ranksum for Wilcoxon-Mann-Whitney studentized statistic.
    The option **ttest** is equivalent to **diffmeans** and included for backward
        compatibility.

p(#**)** specifies the order of the polynomial for outcome adjustment model. Default
    is **p(0)**.

evalat(*point***)** specifies the point at which the adjusted variable is evaluated.
    Allowed options are **cutoff** and **means**. Default is **evalat(cutoff)**.

kernel(*kerneltype***)** specifies the type of kernel to use as weighting scheme. Allowed kernel types are **uniform** (uniform kernel), **triangular** (triangular kernel) and **epan** (Epanechnikov kernel). Default is **kernel(uniform).**

fuzzy(*fuzzy_var [fuzzy_stat]***)** name of the endogenous treatment variable in fuzzy design. This option uses an Anderson-Rubin-type statistic.

  ┌─ Inference ─┘

ci(*# #***)** returns the confidence interval corresponding to the window indicated in *window*. First value is the left limit, second value if the right limit of the window. The values in *window* need to coincide with one of the values in **wlist** and **wlist_left.**

ci_alpha(*#***)** the value of alpha for the confidence interval. Default alpha is 0.05, corresponding to a 95 percent confidence interval.

reps(*#***)** specifies the number of replications. Default is **reps(1000).**

seed(*#***)** sets the seed for the randomization test. With this option, the user can manually set the desired seed, or can enter the value -1 to use the system seed. Default is **seed(666).**

  ┌─ Save and display output ─┘

saving(*filename***)** saves the dataset containing the data for the contour plot in *filename*. This allows the user to replicate and modify the appearance of the plot, and also conduct further sensitivity analysis.

nodots suppresses replication dots.

nodraw suppresses contour plot.

verbose displays matrix of results.

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

Setup
    . **use rdlocrand_senate.dta, clear**

Sensitivity analysis using 1000 replications
    . **rdsensitivity demvoteshfor2 demmv, wlist(.75(.25)2) tlist(0(1)20) reps(1000)**

Obtain confidence interval for window [-.75;.75]
    . **rdsensitivity demvoteshfor2 demmv, wlist(.75(.25)2) tlist(0(1)20) reps(1000) ci(.75)**

Replicate contour graph using saved dataset
    . **rdsensitivity demvoteshfor2 demmv, wlist(.75(.25)2) tlist(0(1)20) reps(1000) saving(graphdata)**
    . **use graphdata, clear**
    . **twoway contour pvalue t w, ccuts(0(0.05)1)**

Saved results

rdsensitivity saves the following in **r():**

Scalars
  r(ci_lb)   lower limit of confidence interval.
  r(ci_ub)   upper limit of confidence interval.

Matrices
  r(results)   matrix of p-values.

References

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

Cattaneo, M.D., Titiunik, R. and G. Vazquez-Bare. 2016. Inference in Regression Discontinuity Designs under Local Randomization.
Stata Journal 16(2): 331–367.

Cattaneo, M. D., Titiunik, R. and G. Vazquez-Bare. 2017. Comparing Inference Approaches for RD Designs: A Reexamination of the Effect of Head Start on Child Mortality.
Journal of Policy Analysis and Management 36(3): 643–681.

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