Title

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rdpermute —— Permutation test for RD and RK designs

Syntax

> **rdpermute** **depen_var indep_var** [*if*], placebo_disconts(*numlist*)
> true_discont(*string*) [position_true_discont(#) deriv_discont(#) bw(#)
> reg(#) linear quad cubic skip_install filename(#) save_path(#) dgp(#)
> bw_manual(#) fg_bandwidth_scaling(# #) fg_bias_porder(#) fg_f_0(#)
> fg_density_porder(#) fg_num_bins(#) cct_bw_par(#) cct_reg_par(#)
> silent] ///

options	Description
Required Parameters	
placebo_disconts(*numlist***)**	defines the locations of placebo discontinuities or kinks
true_discont(*string***)**	defines the position at which the true discontinuity or kink is located
Optional Parameters	
position_true_discont(*integer***)**	
	Position of the expected discontinuity **true_discont** in the vector **placebo_disconts**
deriv_discont(*integer 1***)**	Specifies whether regression discontinuity (0) regression kink (1) design is implemented.
bw(*string***)**	Defines procedure for bandwidth selection. Valid procedures are "bw","cct","fg", "fg_aic" and "manual".
reg(*string***)**	Defines procedure for regression. Valid procedures are "regress","cct".
linear/quad/cubic	Specifies that a linear, quadratic, or cubic model be used.
skip_install	Skips the installation of required packages.
filename(*string***)**	Name for final .dta output
sav_path(*string***)**	Path for final .dta output
dgp(*string***)**	Adds a column with an index variable to .dta output
bw_manual(*real 1***)**	Manual bandwidth for choice reg(manual)
fg_bandwidth_scaling(*numlist***)**	Specifies the model dependent constants for the bandwidth calculation.
fg_bias_porder(*integer 4***)**	Specifies maximal order of polynomial used to estimate m^2 m^3 and m^4 for "fg" bandwidth choice.
fg_f_0(*real 0***)**	Specifies the placement of bins for the choice bw(fg). If not set, 50 equally spaced bins on the range of Data will be used.
fg_density_porder(*integer 3***)**	Specifies polynomial order for density estimation
fg_num_bins(*integer 50***)**	Specifies the number of equally spaced bins for the choice bw(fg) and fg_f_0(0)
cct_bw_par(*string***)**	Specifies additional/alternative parameters for the subroutine rdbwselect for the choice bw(cct)
cct_reg_par(*string***)**	Specifies additional/alternative parameters for the subroutine rdrobust for the choice reg(cct)
silent	Generates less output while running

Description
   rdpermute Implements a permutation test for regression discontinuity (RD) or
   regression kink (RK) designs based on Ganong and Jäger (2017). The code calculates
   RD or RK estimates at a list of pre-specified placebo discontinuities or kinks and
   computes both asymptotic and randomization-based p-values. It tests for the sharp
   null hypothesis of no effect of the policy on the outcome.

Options

┌─ Required ─────────────────────

   placebo_disconts Defines the locations of placebo kinks.

   true_discont Defines the integer at which the true kink or discontinuity is
      located. This value has to appear in the set **placebo_disconts**. If
      placebo_disconts is not generated manually, but automatically (for example by
      loops), it may happen that the binary representations of **true_discont** differs
      from its correspondent copy in **placebo_disconts**. In this case it is possible to
      use the parameter **position_true_discont** instead. Unless rdpermute prints an
      Error-message this is not necessary.

┌─ Optional ─────────────────────

   position_true_discont(*integer -1***)** Position of the expected discontinuity
      true_discont in the vector **placebo_disconts**. This parameter replaces
      true_discont in the case of binary representation Errors.

   deriv_discont(*integer 1***)** Specifies whether regression discontinuity (0) regression
      kink (1) design is implemented. Default is always regression kink design.

   bw(*string***)** Defines the method for the calculation of bandwidths. **fg.aic** is always
      used as default if nothing is specified. All possible choices are:
      - fg: Bandwidth choice as proposed by Fan and Gijbels. The additional
      parameters: **fg_bias_p_order fg_density_p_order**, **fg_num_bins**, **fg_f0**,
      fg_bandwidth_scaling can be used to alter the calculations.
      - fg.aic: Fan and Gijbels bandwidth choice with automatic selection of
      fg_bias_p_order. The additional parameters: **fg_density_p_order**, **fg_num_bins**,
      fg_f0, **fg_bandwidth_scaling** can be used to alter the the calculations.
      - cct: Uses the function **rdbwselect** by Calonico, Cattaneo and Titiunik as
      subroutine. The function call parameters of **rdbwselect** can be altered with the
      parameter **cct_bw_par**. Information on the package rdrobust and its functions is
      provided by Calonica, Cattaneo and Titiunik
      https://sites.google.com/site/rdpackages/rdrobust
      - manual: Manual choice of a constant bandwidth for Data Points . The bandwidth
      can be set with the parameter **manual_bw**.

   reg(*string***)** Defines the procedure for calculating the regressions calculating the
      p-values. **regress** is always used as default if nothing is specified. Valid
      procedures are "regress","cct".
      - cct: Uses the function rdrobust by Calonico, Cattaneo and Titiunik as
      subroutine. The function call parameters of rdrobust can be altered with
      cct_reg_par. Information on the package rdrobust and its functions is provided
      by Calonica, Cattaneo and Titiunik
      https://sites.google.com/site/rdpackages/rdrobust
      - regress: Uses the Stata Regression Enviroment **regress**.

   linear/quad/cubic Specifies that a linear, quadratic, or cubic model be used.
      rdpermute will calculate the p-values for each specified model. If neither
      linear, quad nor cubic are specified, **rdpermute** will calculate the p-values for
      all of them automatically.

   skip_install Skips the installation of required packages. **rdpermute** will try to
      install all dependent packages automatically in a stable-predefined version.
      This is not always possible or desired. **skip_install** suppresses the
      installation. Attention: Some subroutines and parts of our code may not work if
      the dependent packages are not installed.

filename(*string***)** Name for final .dta output. Only if **filename** is provided, data will be saved}.

sav_path(*string***)** Path for final .dta output. If no **save_path** is provided, the results will automatically be placed in working directory.

dgp(*string***)** Adds a column with an index variable to .dta output

bw_manual(*real 1***)** Is a numerical value for the method choice **reg(manual)**. The value will be used as bandwidth for the computation of the p-values for all placebo_disconts.

fg_bandwidth_scaling(*numlist***)** Specifies the model dependent constants for the bandwidth calculation Formula by Fan and Gijbels. It may be necessary to use other values than our presets for linear quadratic and cubic regressions. **fg_bandwidth_scaling[1]** describes the prefactor, **fg_bandwidth_scaling[2]** the used exponents. The parameter **fg_bandwidth_scaling** has to contain values for both entries. All other entries in **fg_bandwidth_scaling** are omitted. A detailed description of the Formula can be found in the References .

fg_bias_porder(*integer 4***)** Specifies maximal order of polynomial used to estimate m^2 m^3 and m^4 for bandwidth choice **bw(fg)**. This parameter is only necessary if the chosen method is fg and not **bw(fg_aic)**. WARNING: A high fg_bias_p_order will result in the instability of the used regressions, without indication by STATA. The choice bw="fg.aic" will automatically prevent such Errors and is therefore set as default.

fg_f_0(*real 0***)** Specifies the placement of bins for the choice bw(fg). If not set, 50 equally spaced bins on the range of Data will be used. We recommend to leave this parameter empty for an automatic estimation of **bw(fg_f_0)**. If you wish to use a manual value you can define a numerical value in fg.f.0

fg_density_porder(*integer 3***)** Specifies polynomial order for density estimation meaning that it denounces the maximal exponent of x^p for the estimation of **bw(fg_f_0)** by regression. WARNING: A high **fg_density_p_order** may lead to the same problems as in {cdm:fg_bias_p_order}. We recommend to use the preset value.

fg_num_bins(*integer 50***)** Specifies the number of equally spaced bins for the choice cmd{bw(fg):} and **fg_f_0(0)** that is used to estimate **fg_f_0**

cct_bw_par(*string***)** Specifies additional/alternative parameters for the subroutine rdbwselect for the choice **bw(cct)**. All parameters of rdbwselect can be altered except for: y, x, p, q, deriv. To alter an Option define the intended values within HTML-Tags within the string. Example: {cmd:cct_bw_par("<kernel>epa</kernel><bwselect>cerrd</bwselect>")"

cct_reg_par(*string***)** Specifies additional/alternative parameters for the subroutine rdrobust for the choice **reg(cct)**. All parameters of rdrobust can be altered except for: y, x, p, q, deriv, h. Altering is done as in **cct_bw_par**.

silent Generates less output while running

Examples

rdpermute y x, **placebo_disconts(-0.9(0.1)0.9) true_discont(0) linear quad silent bw(fg) sav_path(~/Data/working/) filename(placebo_pvalues) dgp(1) fg_density_porder(1)**

rdpermute y x, **placebo_disconts(-100(10)200) true_discont(20) linear silent bw(manual) sav_path(~/Data/working/) filename(placebo_pvalues) bw_manual(10)**

rdpermute y x, **placebo_disconts(1960(0.25)2017) true_discont(2000) linear quad bw(cct) reg(regress) cct_bw_par(<bwselect>cerrd</bwselect>)**

Stored Results

rdpermute stores the following in **e()** (Default matrix output):

e(kink_beta_linear)
          e(kink_se_linear)
          e(bw_linear)
          e(pval_linear)
          e(kink_beta_quadratic)
          e(kink_se_quadratic)
          e(bw_quadratic)
          e(pval_quadratic)
          e(kink_beta_cubic)
          e(kink_se_cubic)
          e(bw_cubic)
          e(pval_cubic)

    With N as number of placebo kinks, matrices kink* and bw* are Nx2. Column 1 is
    output using "cct" bandwidth choice. Column 2 uses "fg" bandwidth choice.

    Matrices pval* are 2 x 2. Row 1 is asymptotic p-value. Row 2 is randomization
    p-value.

    Optional .dta output: collapses all of the above into a single file.

Dependencies

    rdrobust Calonico, Matias D. Cattaneo, Max H. Farrell and Rocio Titiunik
    rdbwselect Calonico, Matias D. Cattaneo, Max H. Farrell and Rocio Titiunik
    rd Austin Nichols

    All dependent packages will automatically download at the first run of rdpermute.
        See **skip_install** for suppressing the installation.

References

    Calonico, S., Cattaneo, M. D., and Titiunik, R. "Robust Nonparametric Confidence
        Intervals for Regression-Discontinuity Designs." *Econometrica*, 82(6):2295-2326
        (2014).

    Fan, J. and Gijbels, I. *Local Polynomial Modelling and Its Applications,* volume 66.
        Chapman and Hall (1996).

    Ganong, P. and Jäger, S. "A Permutation Test for the Regression Kink Design."
        Journal of the American Statistical Association (2017).

Also See

    [rdbwselect](#) - Bandwidth Selection Procedures for Local Polynomial Regression
        Discontinuity Estimators (by Calonico, Cattaneo, Farrell, and Titiunik)

    [rdrobust](#) - Local Polynomial Regression Discontinuity Estimation with Robust
        Bias-Corrected Confidence Intervals and Inference Procedures (by Calonico,
        Cattaneo, Farrell, and Titiunik)

    [rdplot](#) - Data-Driven Regression Discontinuity Plots (by Calonico, Cattaneo,
        Farrell, and Titiunik)

Authors

    Peter Ganong, University of Chicago, ganong@uchicago.edu

    Simon Jäger, MIT, sjaeger@mit.edu

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