Title

persuasio4ytz2lpr — Conduct causal inference on the local persuasion rate for binary outcomes *y*, binary treatments *t* and binary instruments *z*

Syntax

persuasio4ytz2lpr *depvar treatvar instrvar* [*covariates*] [*if*] [*in*] [, **level**(*#*) **model**(*string*) **method**(*string*) **nboot**(*#*) **title**(*string*)]

Options

option	*Description*
level(*#*)	Set confidence level; default is **level**(95)
model(*string*)	Regression model when *covariates* are present
method(*string*)	Inference method; default is **method**("normal")
nboot(*#*)	Perform # bootstrap replications
title(*string*)	Title

Description

persuasio4ytz2lpr conducts causal inference on causal inference on the local persuasion rate.

It is assumed that binary outcomes *y*, binary treatments *t*, and binary instruments *z* are observed. This command is for the case when persuasive treatment (*t*) is observed, using estimates of the local persuasion rate (LPR) via this package's command **lpr4ytz**.

varlist should include *depvar treatvar instrvar covariates* in order. Here, *depvar* is binary outcome (*y*), *treatvar* is binary treatment, *instrvar* is binary instrument (*z*), and *covariates* (*x*) are optional.

There are two cases: (i) *covariates* are absent and (ii) *covariates* are present.

- Without *x*, the LPR is defined by

LPR = $\{Pr(y=1|z=1)-Pr(y=1|z=0)\}/\{Pr[y=0,t=0|z=0]-Pr[y=0,t=0|z=1]\}$.

The estimate and its standard error are obtained by the following procedure:

1. The numerator of the LPR is estimated by regressing *y* on *z*.
2. The denominator is estimated by regressing (1-*y*)*(1-*t*) on *z*.
3. The LPR is obtained as the ratio.
4. The standard error is computed via STATA command **nlcom.**
5. Then, a confidence interval for the LPR is obtained via the usual normal approximation.

- With *x*, the LPR is defined by

LPR = $E[$**LPR**$(x)\{e(1|x) - e(0|x)\}]/E[e(1|x) - e(0|x)]$

where

LPR$(x) = \{Pr(y=1|z=1,x) - Pr(y=1|z=0,x)\}/\{Pr[y=0,t=0|z=0,x] - Pr[y=0,t=0|z=1,x]\}$,

$e(1|x) = Pr(t=1|z=1,x)$, and $e(0|x) = Pr(t=1|z=0,x)$.

The estimate is obtained by the following procedure.

If **model**("no_interaction") is selected (default choice),

1. The numerator of the LPR is estimated by regressing *y* on *z* and *x*.
2. The denominator is estimated by regressing (1-*y*)*(1-*t*) on *z* and *x*.
3. The LPR is obtained as the ratio.
4. The standard error is computed via STATA command **nlcom.**
5. Then, a confidence interval for the LPR is obtained via the usual normal approximation.

Note that in this case, **LPR**(*x*) does not depend on *x* because of the linear regression model specification.

Alternatively, if **model**("interaction") is selected,

1. $Pr(y=1|z,x)$ is estimated by regressing *y* on *x* given *z* = 0,1.

2. $Pr[y=0,t=0|z,x]$ is estimated by regressing (1-*y*)*(1-*t*) on *x* given *z* = 0,1.

3. $Pr(t=1|z,x)$ is estimated by regressing *t* on *x* given *z* = 0,1.

4. For each *x* in the estimation sample, both **LPR**(*x*) and $\{e(1|x)-e(0|x)\}$ are evaluated.

5. Then, the sample analog of **LPR** is constructed.

6. Finally, the bootstrap procedure is implemented via STATA command **bootstrap**.

Options

model(*string*) specifies a regression model of *y* on *z* and *x*.

This option is only relevant when *x* is present. The default option is "no_interaction" between *z* and *x*. When "interaction" is selected, full interactions between *z* and *x* are allowed.

level(#) sets confidence level; default is **level**(95).

method(*string*) refers the method for inference.

The default option is **method**("normal"). Since the LPR is point-identified, usual two-sided confidence intervals are produced.

1. When **model**("interaction") is chosen as an option, it needs to be set as **method**("bootstrap"); otherwise, the confidence interval will be missing.

nboot(#) chooses the number of bootstrap replications.

The default option is **nboot**(50). It is only relevant when **method**("bootstrap") is selected.

title(*string*) specifies a title.

Remarks

It is recommended to use **nboot**(#) with # at least 1000. A default choice of 50 is meant to check the code initially because it may take a long time to run the bootstrap part. The bootstrap confidence interval is based on percentile bootstrap. Normality-based bootstrap confidence interval is not recommended because bootstrap standard errors can be unreasonably large in applications.

Examples

We first call the dataset included in the package.

```
. use GKB, clear
```

The first example conducts inference on the LPR without covariates, using normal approximation.

```
. persuasio4ytz2lpr voteddem_all readsome post, level(80)
method("normal")
```

The second example conducts bootstrap inference on the LPR.

```
. persuasio4ytz2lpr voteddem_all readsome post, level(80)
method("bootstrap") nboot(1000)
```

The third example conducts bootstrap inference on the LPR with a covariate, MZwave2, interacting with the instrument, post.

```
. persuasio4ytz2lpr voteddem_all readsome post MZwave2, level(80)
model("interaction") method("bootstrap") nboot(1000)
```

Stored results

Matrices

e(lpr_est): (1*1 matrix) estimate of the local persuasion rate

e(lpr_ci): (1*2 matrix) confidence interval for the local persuasion rate in the form of [lb_ci, ub_ci]

Macros

e(cilevel): confidence level

e(inference_method): inference method: "normal" or "bootstrap"

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References

Sung Jae Jun and Sokbae Lee (2019), Identifying the Effect of Persuasion, arXiv:1812.02276 [econ.EM]

Version

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