version 0.1.0

Title

persuasio4ytz2lpr —— Conducts causal inference on the local persuasion rate for binary outcome *y*, binary treament *t* and binary instrument *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 of estimation

Description

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

It is assumed that binary outcome *y*, binary treatment *t*, and binary instrument *z* are observed. This command is for the case when persuasive treatment (*t*) is observed, using estimates of the local persuation rate (LPR) via this package's command **lprlb4ytz.**

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.

- If *x* are absent, 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 norm
> al approximation.

- If x are present, 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 norm
> al 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 releveant 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 the title of estimation.

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 when there are a large number of covariates. The bootstrap confidence interval is based on percentile bootstrap. A use of 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]