

Title

lpr4ytz — Estimate the local persuasion rate

Syntax

```
lpr4ytz depvar treatrvar instrvar [covariates] [if] [in] [,  
model(string) title(string)]
```

Options

| <i>option</i> | <i>Description</i> |
|--------------------------------|---|
| model (<i>string</i>) | Regression model when <i>covariates</i> are present |
| title (<i>string</i>) | Title of estimation |

Description

lpr4ytz estimates the local persuasion rate (LPR). *varlist* should include *depvar treatrvar instrvar covariates* in order. Here, *depvar* is binary outcomes (*y*), *treatrvar* is binary treatments (*t*), *instrvar* is binary instruments (*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

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

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**.

- With *x*, the LPR is defined by

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

where

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

$$e(1|x) = \Pr(t=1|z=1,x), \text{ and } e(0|x) = \Pr(t=1|z=0,x).$$

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`.

Note that in this case, $\mathbf{LPR}(x)$ 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 $\mathbf{LPR}(x)$ and $\{e(1|x)-e(0|x)\}$ are evaluated.
5. Then, the sample analog of \mathbf{LPR} is constructed.

When *covariates* are present, the standard error is missing because an analytic formula for the standard error is complex. Bootstrap inference is implemented when this package's command `persuasio` is called to conduct inference.

Options

`model(string)` specifies a regression model.

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.

title(*string*) specifies the title of estimation.

Remarks

It is recommended to use this package's command **persuasio** instead of calling **lpr4ytz** directly.

Examples

We first call the dataset included in the package.

```
. use GKB, clear
```

The first example estimates the LPR without covariates.

```
. lpr4ytz voteddem_all readsome post
```

The second example adds a covariate.

```
. lpr4ytz voteddem_all readsome post MZwave2
```

The third example allows for interactions between *x* and *z*.

```
. lpr4ytz voteddem_all readsome post MZwave2, model("interaction")
```

Stored results

Scalars

e(N): sample size

e(lpr_coef): estimate of the local persuasion rate

e(lpr_se): standard error of the estimate of the local persuasion rate

Macros

e(outcome): variable name of the binary outcome variable

e(treatment): variable name of the binary treatment variable

e(instrument): variable name of the binary instrumental variable

e(covariates): variable name(s) of the covariates if they exist

e(model): regression model specification ("no_interaction" or "interaction")

Functions:

e(sample): 1 if the observations are used for estimation, and 0 otherwise.

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References

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