Title

aprlb — Estimate the lower bound on the average persuasion rate

Syntax

aprlb *depvar instrvar* [*covariates*] [*if*] [*in*] [, **model**(*string*) **title**(*string*)]

Options

option	*Description*
model(*string*)	Regression model when *covariates* are present
title(*string*)	Title

Description

aprlb estimates the lower bound on the average persuasion rate (APR). *varlist* should include *depvar instrvar covariates* in order. Here, *depvar* is binary outcomes (*y*), *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 lower bound (**theta_L**) on the APR is defined by

$$\textbf{theta\_L} = \{\Pr(y=1|z=1) - \Pr(y=1|z=0)\}/\{1 - \Pr(y=1|z=0)\}.$$

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

1. $\Pr(y=1|z=1)$ and $\Pr(y=1|z=0)$ are estimated by regressing *y* on *z*.
2. **theta_L** is computed using the estimates obtained above.
3. The standard error is computed via STATA command **nlcom**.

- With *x*, the lower bound (**theta_L**) on the APR is defined by

theta_L = E[**theta_L_num**(x)]/E[**theta_L_den**(x)],

where

theta_L_num(x) = Pr(y=1|z=1,x) - Pr(y=1|z=0,x)

and

theta_L_den(x) = 1 - Pr(y=1|z=0,x).

The estimate is obtained by the following procedure.

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

1. Pr(y=1|z,x) is estimated by regressing y on z and x.

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

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

Ater step 1, both options are followed by:

2. For each x in the estimation sample, **theta_L_num**(x) and **theta_L_den**(x) are evaluated.

3. The estimates of **theta_L_num**(x) and **theta_L_den**(x) are averaged to estimate **theta_L**.

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 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; this is accomplished by estimating Pr(y=1|z=1,x) and Pr(y=1|z=0,x), separately.

title(*string*) specifies a title.

Remarks

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

Examples

We first call the dataset included in the package.

```
. use GKB, clear
```

The first example estimates the lower bound on the APR without covariates.

```
. aprlb voteddem_all post
```

The second example adds a covariate.

```
. aprlb voteddem_all post MZwave2
```

The third example estimates the lower bound by the covariate.

```
    . by MZwave2, sort: aprlb voteddem_all post
```

Stored results

Scalars

e(N): sample size

e(lb_coef): estimate of the lower bound on the average persuasion rate

e(lb_se): standard error of the lower bound on the average persuasion rate

Macros

e(outcome): variable name of the binary outcome 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 (2022), Identifying the Effect of Persuasion, arXiv:1812.02276 [econ.EM]

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