Title

aprub — Estimate the upper bound on the average persuasion rate

Syntax

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

Options

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

Description

aprub estimates the upper bound on the average persuasion rate (APR). *varlist* should include *depvar treatrvar instrvar covariates* in order. Here, *depvar* is binary outcomes (*y*), *treatrvar* is binary treatment (*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 upper bound (**theta_U**) on the APR is defined by

theta_U = {E[*A*|*z*=1] - E[*B*|*z*=0]}/{1 - E[*B*|*z*=0]},

where *A* = 1(*y*=1,*t*=1)+1-1(*t*=1) and *B* = 1(*y*=1,*t*=0).

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

1. E[*A*|*z*=1] is estimated by regressing *A* on *z*.
2. E[*B*|*z*=0] is estimated by regressing *B* on *z*.
3. **theta_U** is computed using the estimates obtained above.
4. The standard error is computed via STATA command **nlcom**.

- With *x*, the upper bound (**theta_U**) on the APR is defined by

    theta_U = E[**theta_U_num**(*x*)]/E[**theta_U_den**(*x*)],

where

    theta_U_num(*x*) = E[*A*|*z*=1,*x*] - E[*B*|*z*=0,*x*]

and

    theta_U_den(*x*) = 1 - E[*B*|*z*=0,*x*].

The estimate is obtained by the following procedure.

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

1. E[*A*|*z*=1,*x*] is estimated by regressing *A* on *z* and *x*.
2. E[*B*|*z*=0,*x*] is estimated by regressing *B* on *z* and *x*.

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

1. E[*A*|*z*=1,*x*] is estimated by regressing *A* on *x* given *z* = 1.
2. E[*B*|*z*=0,*x*] is estimated by regressing *B* on *x* given *z* = 0.

Ater step 1, both options are followed by:

3. For each *x* in the estimation sample, **theta_U_num**(*x*) and **theta_U_den**(*x*) are evaluated.

4. The estimates of **theta_U_num**(*x*) and **theta_U_den**(*x*) are averaged to estimate **theta_U**.

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 dependent variable is either *A* or *B*. 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 a title.

Remarks

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

Examples

We first call the dataset included in the package.

```
. use GKB_persuasio, clear
```

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

```
. aprub voteddem_all readsome post
```

The second example adds a covariate.

```
. aprub voteddem_all readsome post MZwave2
```

The third example estimates the upper bound by the covariate.

```
    . by MZwave2,sort: aprub voteddem_all readsome post
```

Stored results

Scalars

e(N): sample size

e(ub_coef): estimate of the upper bound on the average persuasion rate

e(ub_se): standard error of the upper bound on the average 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 (2022), Identifying the Effect of Persuasion, arXiv:1812.02276 [econ.EM]

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