

version 0.1.0

## Title

---

**aprlb** — Estimates the lower bound on the average persuasion rate

## Syntax

---

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

## Options

<i>option</i>	<i>Description</i>
<b>model(string)</b>	Regression model when <i>covariates</i> are present; default > t is "no_interaction"
<b>title(string)</b>	Title of estimation

## 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.

- If *covariates* are absent, the lower bound (*theta\_L*) on the APR is defined by

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

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

1.  $\text{Pr}(y = 1 \mid z = 1)$  and  $\text{Pr}(y = 1 \mid z = 0)$  are estimated by regressing *y* on *z*.
2. The lower bound on the APR is computed using the estimates obtained above.
3. The standard error of the estimate is computed via STATA command **nlcom**.

- If *covariates* are present, the lower bound ( $\theta_L$ ) on the APR is defined by

$$\theta_L = E [ \theta_L(x) ],$$

where

$$\theta_L(x) = \{ \Pr( y = 1 \mid z = 1, x ) - \Pr( y = 1 \mid z = 0, x ) \} / \{ 1 - \Pr( y = 1 \mid z = 0, x ) \}.$$

The estimate is obtained by the following procedure.

If **model**("no\_interaction") is selected (default choice),

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

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

1a.  $\Pr( y = 1 \mid z = 1, x )$  is estimated by regressing  $y$  on  $x$  given  $z = 1$ .

1b.  $\Pr( y = 1 \mid z = 0, x )$  is estimated by regressing  $y$  on  $x$  given  $z = 0$ .

After step 1, both options are followed by:

2. For each  $x$  in the estimation sample,  $\theta_L(x)$  is computed using the estimates obtained above.

3. The estimates of  $\theta_L(x)$  are averaged to obtain the estimate of  $\theta_L$ .

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  $x$  when *covariates* are 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  $\Pr( y = 1 \mid z = 1, x )$  and  $\Pr( y = 1 \mid z = 0, x )$ , separately.

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

## **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 covariates.

```
. aprlb voteddem_all post doperator*
```

## **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.

## **Authors**

---

Sung Jae Jun, Penn State University, <sjun@psu.edu>

Sokbae Lee, Columbia University, <sl3841@columbia.edu>

## **License**

---

GPL-3

## **References**

---

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