

Package ‘causalsens’

June 18, 2018

Version 0.1.2

Date 2018-06-18

Title Selection Bias Approach to Sensitivity Analysis for Causal Effects

Author Matthew Blackwell <mblackwell@gov.harvard.edu>

Maintainer Matthew Blackwell <mblackwell@gov.harvard.edu>

Imports stats, graphics, grDevices

Depends R (>= 3.0.0)

Description The causalsens package provides functions to perform sensitivity analyses and to study how various assumptions about selection bias affects estimates of causal effects.

License GPL (>= 2)

URL <http://www.mattblackwell.org/software/causalsens/>

VignetteBuilder knitr

Suggests knitr

Collate 'causalsens.R'

NeedsCompilation no

Repository CRAN

Date/Publication 2018-06-18 20:06:37 UTC

R topics documented:

causalsens	2
lalonde.exp	2
lalonde.psid	3
one.sided	4
plot.causalsens	5

Index	6
--------------	----------

causalsens	<i>Calculate sensitivity of causal estimates to unmeasured confounding.</i>
------------	---

Description

This function performs a sensitivity analysis of causal effects different assumptions about unmeasured confounding, as described by Blackwell (2013).

Usage

```
causalsens(model.y, model.t, cov.form,
           confound = one.sided, data, alpha)
```

Arguments

model.y	outcome model object. Currently only handles lm objects.
model.t	propensity score model. Currently assumes a glm object.
cov.form	one-sided formula to describe any covariates to be included in the partial R ² calculations.
confound	function that calculates the confounding function. This function must take arguments alpha, pcores, and treat. Defaults to <code>one.sided</code> . Other functions included with the package are <code>one.sided.att</code> , <code>alignment</code> , and <code>alignment.att</code> .
data	data frame to find the covariates from cov.form.
alpha	vector of confounding values to pass the confounding function. Defaults to 11 points from -0.5 to 0.5 for binary outcome variable, and 11 points covering the inter-quartile range for non-binary outcome variables.

Value

Returns an object of class `causalsens`.

- sens data frame containing alpha values, partial R²s, estimates, and 95
- partial.r2 vector of partial R² values for the covariates to compare to sensitivity analysis results.

lalonde.exp	<i>Experimental data from the job training program first studied by LaLonde (1986)</i>
-------------	--

Description

A dataset of units in an experimental evaluation of a job training program. Subset to those units with two years of pre-treatment income data.

Format

A data frame with 445 rows and 12 variables

Details

- age - age in years.
- education - number of years of schooling.
- black - 1 if black, 0 otherwise.
- hispanic - 1 if Hispanic, 0 otherwise.
- married - 1 if married, 0 otherwise.
- nodegree - 1 if no high school degree, 0 otherwise.
- re74 - earnings (\$) in 1974.
- re75 - earnings (\$) in 1975.
- re78 - earnings (\$) in 1978.
- u74 - 1 if unemployed in 1974, 0 otherwise.
- u75 - 1 if unemployed in 1975, 0 otherwise.
- treat - 1 if treated, 0 otherwise.

References

LaLonde, Robert J. (1986). Evaluating the Econometric Evaluations of Training Programs with Experimental Data. *The American Economic Review*, 76(4), 604–620.

lalonge.psid

Non-experimental data from Lalonde (1986)

Description

A dataset of experimental treated units and non-experimental control units from the Panel Study of Income Dynamics (PSID).

Format

A data frame with 2675 rows and 12 variables

Details

- age - age in years.
- education - number of years of schooling.
- black - 1 if black, 0 otherwise.
- hispanic - 1 if Hispanic, 0 otherwise.
- married - 1 if married, 0 otherwise.

- nodegree - 1 if no high school degree, 0 otherwise.
- re74 - earnings (\$) in 1974.
- re75 - earnings (\$) in 1975.
- re78 - earnings (\$) in 1978.
- u74 - 1 if unemployed in 1974, 0 otherwise.
- u75 - 1 if unemployed in 1975, 0 otherwise.
- treat - 1 if treated, 0 otherwise.

References

LaLonde, Robert J. (1986). Evaluating the Econometric Evaluations of Training Programs with Experimental Data. *The American Economic Review*, 76(4), 604–620.

one.sided

Confounding functions

Description

Various confounding functions for use with [causalsens](#).

Usage

```
one.sided(alpha, pscores, treat)
```

```
alignment(alpha, pscores, treat)
```

```
one.sided.att(alpha, pscores, treat)
```

```
alignment.att(alpha, pscores, treat)
```

Arguments

alpha	vector of confounding values to use in the sensitivity analysis.
pscores	vector of propensity scores for each unit.
treat	vector of treatment values for each unit.

plot.causalsens	<i>Plot a causal sensitivity analysis.</i>
-----------------	--

Description

Plot the results of a sensitivity analysis against unmeasured confounding as performed by [causalsens](#)

Usage

```
## S3 method for class 'causalsens'  
plot(x, type = "r.squared", ...)
```

Arguments

x	causalsens object.
type	a string taking either the value "r.squared" (default), which plots the estimated effects as a function of the partial R-squared values, or "raw", which plots them as a function of the raw confounding values, alpha.
...	other parameters to pass to the plot.

Index

*Topic **datasets**

lalonge.exp, 2
lalonge.psid, 3

alignment, 2
alignment (one.sided), 4
alignment.att, 2

causalsens, 2, 4, 5

lalonge.exp, 2
lalonge.psid, 3

one.sided, 2, 4
one.sided.att, 2

plot.causalsens, 5