

# Package: causalsens (via r-universe)

September 14, 2024

**Version** 0.1.3

**Date** 2024-03-18

**Title** Selection Bias Approach to Sensitivity Analysis for Causal Effects

**Author** Matthew Blackwell <mblackwell@gov.harvard.edu.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** <https://www.mattblackwell.org/software/causalsens/>

**VignetteBuilder** knitr

**Suggests** rmarkdown, knitr

**Encoding** UTF-8

**Collate** 'causalsens.R'

**RoxygenNote** 7.0.2

**Repository** <https://mattblackwell.r-universe.dev>

**RemoteUrl** <https://github.com/mattblackwell/causalsens>

**RemoteRef** HEAD

**RemoteSha** be0b5376c8d507357f4aa4f13b30802539a9862b

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causalsens	<i>Calculate sensitivity of causal estimates to unmeasured confounding.</i>
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### 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,
  level = 0.95
)
```

### Arguments

<code>model.y</code>	outcome model object. Currently only handles <code>lm</code> objects.
<code>model.t</code>	propensity score model. Currently assumes a <code>glm</code> object.
<code>cov.form</code>	one-sided formula to describe any covariates to be included in the partial $R^2$ calculations.
<code>confound</code>	function that calculates the confounding function. This function must take arguments <code>alpha</code> , <code>pscores</code> , and <code>treat</code> . 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> .
<code>data</code>	data frame to find the covariates from <code>cov.form</code> .
<code>alpha</code>	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 a interval with width equal to the inter-quartile range and centered at 0 for non-binary outcome variables.
<code>level</code>	level of the confidence interval returned.

### Value

Returns an object of class `causalsens`.

- `sens` data frame containing `alpha` values, partial  $R^2$ s, estimates, and 95
- `partial.r2` vector of partial  $R^2$  values for the covariates to compare to sensitivity analysis results.

**Examples**

```
data(lalonge.exp)

ymodel <- lm(re78 ~ treat+age + education + black + hispanic +
married + nodegree + re74 + re75 + u74 + u75, data = lalonge.exp)

pmodel <- glm(treat ~ age + education + black + hispanic + married
+ nodegree + re74 + re75 + u74 + u75, data = lalonge.exp,
family = binomial())

alpha <- seq(-4500, 4500, by = 250)

ll.sens <- causalsens(ymodel, pmodel, ~ age + education, data =
lalonge.exp, alpha = alpha, confound = one.sided.att)
```

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

**Usage**

```
data(lalonge.exp)
```

**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.

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lalonde.psid

*Non-experimental data from Lalonde (1986)*

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**Description**

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

**Usage**

```
data(lalonde.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.

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one.sided	<i>Confounding functions</i>
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**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.

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

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