

Package ‘pgsc’

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Type Package

Title Computes Powell's Generalized Synthetic Control Estimator

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Author Philip Barrett

Maintainer Philip Barrett <pobarrett@gmail.com>

Description Computes the generalized synthetic control estimator described in Powell (2017) <[doi:10.7249/WR1142](https://doi.org/10.7249/WR1142)>. Provides both point estimates, and hypothesis testing.

License GPL-2

Depends R (>= 2.10), Rcpp (>= 0.12.18), nloptr, reshape2

LinkingTo Rcpp, RcppArmadillo

RoxygenNote 6.1.0

Suggests knitr, rmarkdown, plm

VignetteBuilder knitr

URL <https://github.com/philipbarrett/pgsc>

Encoding UTF-8

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 pgsc

Wrapper function for GSC estimation

Description

Wrapper function for GSC estimation

Usage

```
pgsc(dta, dep.var, indep.var, b.init, method, sol.it = NULL,
     wt.init = NULL, print.level = 0, g.i = NULL, g.i.grad = NULL,
     ...)
```

Arguments

<code>dta</code>	A data frame
<code>dep.var</code>	A string defining the dependent variable
<code>indep.var</code>	A vector of strings defining the independent (treatment) variables
<code>b.init</code>	An initial value for the treatment variable coefficients. Must have same length as ‘ <code>indep.var</code> ’
<code>method</code>	The GSC iteration method to be used. Must be one of: <ul style="list-style-type: none"> • <code>onestep</code>: "Plain" GSC solution, without weights • <code>twostep.aggte</code>: Observations weighted by unit MSEs from the one-step solution. • <code>twostep.indiv</code>: Observations weighted by unit MSEs from individual, unit-by-unit unweighted solutions.
<code>sol.it</code>	The first step solution used in the two-step methods. If omitted, a new one-step solution is computed.
<code>wt.init</code>	An initial value for the weighting matrix
<code>print.level</code>	The level of detail provided in the printed output
<code>g.i</code>	A function defining a restriction on the parameters. Used in hypothesis testing.
<code>g.i.grad</code>	The gradient of <code>g.i</code> .
<code>...</code>	Other arguments to be passed to the optimization

Details

See the vignette "Using pgsc" for an extended example.

Value

Returns the point estimate of the model as a gsc object, a list with entries:

b The point estimate of the coefficients on the dependent variables

diff The difference between successive iterations

err The maximum error on the within-iteration optimization problems

it Number of iterations require to solve

sig.i The unit-specific MSEs from the solution

W The "full" weighting matrix for counterfactuals, containing own-unit weights (all zero) and unit-N weights

wt The "minimal" weighting matrix, omitting own-unit weights and weights on unit N (which can be computed as one-minus-rowsum)

Examples

```
data("pgsc.dta")
sol <- pgsc(pgsc.dta, dep.var = 'y', indep.var = c('D1','D2'),
b.init = c(0,0), method='onestep' )
summary(sol)
g.i <- function(b) b[1] ; g.i.grad <- function(b) c(1,0)
sol.r <- pgsc(pgsc.dta, dep.var = 'y', indep.var = c('D1','D2'),
b.init = sol$b, method='onestep', g.i=g.i, g.i.grad=g.i.grad )
summary(sol.r)
```

pgsc.dta

Synthetic data for PGSC testing.

Description

A dataset with an outcome given by a treatment and a set of factors.

Usage

pgsc.dta

Format

A data frame with 750 rows and 8 variables:

n The unit, here labeled as a US state

t The time period

y The outcome variable

D1 The first treatment variable

D2 The second treatment variable

X1 The first observed confounding factor

X2 The second observed confounding factor

X3 The third observed confounding factor

Source

Generated by code in the package vignette "Using pgsc".

pgsc.wald.test	<i>A wrapper for the wald test of a restricted solution</i>
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Description

A wrapper for the wald test of a restricted solution

Usage

```
pgsc.wald.test(dta, dep.var, indep.var, sol.rest, n.boot = 10000,
  seed = 42)
```

Arguments

dta	A dataframe
dep.var	A vector of strings of names of dependent variables.
indep.var	A vector of strings of names of independent (treatment) variables.
sol.rest	A restricted solution which is being tested
n.boot	The number of bootstrapped samples for the variance calculation. Default is 10000.
seed	Randomization seed. Default is 42.

Details

See the vignette "Using pgsc" for an extended example.

Value

Returns the wald test as gsc.wald object, a list with entries:

b The point estimate of the coefficients on the dependent variables

S The Wald statistic

s.boot The bootstrapped Wald statistic

p.value The p-value for the Wald statistic.

Examples

```
data("pgsc.dta")
g.i <- function(b) b[1] ; g.i.grad <- function(b) c(1,0)
sol.r <- pgsc(pgsc.dta, dep.var = 'y', indep.var = c('D1','D2'),
  b.init = c(0,1), method='onestep', g.i=g.i, g.i.grad=g.i.grad )
wald <- pgsc.wald.test( pgsc.dta, 'y', indep.var = c('D1','D2'), sol.r )
summary(wald)
plot(wald)
```

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