Package 'vcPB'

July 22, 2025

Type Package

Title Longitudinal PB Varying-Coefficient Groupwise Disparity Model

Version 1.1.1

Description Estimating the disparity between two groups based on the extended model of the Peters-Belson (PB) method. Our model is the first work on the longitudinal data, and also can set a varying variable to find the complicated association between other variables and the varying variable. Our work is an extension of the Peters-Belson method which was originally published in Peters (1941)<doi:10.1080/00220671.1941.10881036> and Belson (1956)<doi:10.2307/2985420>.

Depends KernSmooth, rlist, lme4, methods

License GPL-3

Encoding UTF-8

RoxygenNote 7.2.3

URL https://github.com/SangkyuStat/vcPB,

https://sangkyustat.github.io/vcPB/

BugReports https://github.com/SangkyuStat/vcPB/issues

NeedsCompilation no

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Repository CRAN

Date/Publication 2024-03-26 17:00:02 UTC

Contents

pb	*Peters-Belson Disparity Analysis*

Description

Function pb offers Peters-Belson(PB) type of regression method which gets the disparity between a majority group and a minority group based on various regression models.

Usage

```
pb(formula, group, data, family = "gaussian")
```

Arguments

formula	a formula for the model.
group	a vector within the data which is used for separating majority and minority groups.
data	a data frame and data has to be included with the form of data.frame.
family	a character indicating which model should be used. Details can be found later.

Value

pb returns an object of class "pb", which is a list containing following components:

call	a matched call.
overall_disparity	
	overall disparity between major and minor groups.
explained_disparity	
	explained disparity between major and minor groups.
unexplained_disparity	
	unexplained disparity between major and minor groups.
major	a majority group label.
minor	a minority group label.

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vc.pb	*Varying-Coefficient Disparity Decomposition Analysis for a Longitudinal Data*

Description

The `vc.pb` offers Peters-Belson(PB) type of nonparametric varying-coefficient regression method which measures the disparity between a majority group and a minority group for the longitudinal data.

Usage

```
vc.pb(
  formula,
  group,
  data,
  id,
  modifier = NULL,
  local_time = NULL,
  bandwidth_M = NULL,
  bandwidth_m = NULL,
  bandwidth_xM = NULL,
  bandwidth_xm = NULL,
  bandwidth_Z_M = NULL,
  bandwidth_Z_m = NULL,
  bandwidth_Z_xM = NULL,
  bandwidth_Z_xm = NULL,
  detail = FALSE,
  ...
)
```

Arguments

formula	a formula for the model.
group	a vector within the `data` which is used for separating majority and minority groups.
data	a data frame and data has to be included with the form of `data.frame`.
id	a vector within the `data` which is used for identifying the observations.
modifier	(optional) a vector from the `data` which is an optional argument to add the varying term into the model. The default is `NULL`. If the class of the vector is given as `integer` then, the continuous version of `vc.PB` is performed and if the class is `factor` or `character`, then the discrete version is proceeded. Three different sets of inputs are needed for different versions.
local_time	(optional) a vector used for the local points of time variable in the kernel regression.

bandwidth_M	(optional) a bandwidth for the time variable used for estimating the time-varying coefficient of the majority group.
bandwidth_m	(optional) a bandwidth for the time variable used for estimating the time-varying coefficient of the minority group.
bandwidth_xM	(optional) a vector of p number of bandwidths for estimating the local expectations of the design matrix for the majority group.
bandwidth_xm	(optional) a vector of p number of bandwidths for estimating the local expectations of the design matrix for the minority group.
bandwidth_Z_M	(optional) a bandwidth for the varying variable used for estimating the time-varying coefficient of the majority group. Used only when the class of modifier is integer.
bandwidth_Z_m	(optional) a bandwidth for the varying variable used for estimating the time-varying coefficient of the minority group. Used only when the class of modifier is integer.
bandwidth_Z_xM	(optional) a vector of p number of bandwidths for estimating the local expectations of the design matrix related to varying variable for the majority group. Used only when the class of modifier is integer.
bandwidth_Z_xm	(optional) a vector of p number of bandwidths for estimating the local expectations of the design matrix related to varying variable for the minority group. Used only when the class of modifier is integer.
detail	a bool argument whether the detailed results are provided or not.
...	used for controlling the others.

Value

vc.pb returns an object of class "vc.pb", which is a list containing following components:

call	a matched call.
overall_disparity	
	overall disparity between major and minor groups.
explained_disparity	
	explained disparity between major and minor groups, this component is given only when varying is null.
explained_disparity_by_X	
	explained disparity from the variables without modifier variable given that the modifier variable is from the majority group, this component is given only when varying is not null.
explained_disparity_by_Z	
	explained disparity from modifier variable, this component is given only when varying is not null.
unexplained_disparity	
	unexplained disparity between major and minor groups.
times	local time points used for kernel regression.
major	a majority group label.
minor	a minority group label.

modfier, varying.type

> the modifier variable and the type of the modifier variable, these components are given only when `varying` is not null.

bandwidths various corresponding bandwidths. Please see the details or the attached reference for more information.

Author(s)

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Examples

```
set.seed(1)
n <- 100
x1 <- rnorm(n)
x2 <- rnorm(n)
time <- rep(1:5, 20) + runif(n)
y <- rnorm(n)
sub_id <- rep(1:25, 1, each = 4)
group <- rep(as.character(1:2), 25, each = 2)
z <- as.character(rbinom(n, 1, prob = 0.5))

data <- data.frame(y = y, x1 = x1, x2 = x2, z = z, group = group, time = time, sub_id = sub_id)

fit <- vc.pb(y ~ (x1|time) + x2, data = data, id = sub_id, group = group)
fit
```

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