Package ‘wqs’

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Type Package
Title Weighted Quantile Sum Regression
Version 0.0.1
Date 2015-10-05
Author Jenna Czarnota, David Wheeler
Maintainer Jenna Czarnota <jennaczarnota@gmail.com>
Description Fits weighted quantile sum regression models, calculates weighted quantile sum index and estimated component weights.
Depends R (>= 3.2.1)
Imports Rsolnp, glm2
License GPL (>= 2)
LazyLoad yes
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R topics documented:

wqs-package ................................................................. 2
wqs.est ................................................................. 3
WQSdata ................................................................. 4

Index 6
wqs-package

Weighted Quantile Sum Regression

Description

Fits weighted quantile sum regression models, calculates weighted quantile sum index and estimated component weights.

Details

The DESCRIPTION file:

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License: GPL (>=2)
LazyLoad: yes

Index of help topics:

WQ5data Simulated data to test WQS
wqs-package Weighted Quantile Sum Regression
wqs.est Weighted Quantile Sum Regression

This package performs weighted quantile sum (WQS) regression, by fitting a WQS regression model for a continuous outcome variable. The components (e.g. chemicals) to be combined into an index are scored into quantiles and then used in the estimation of empirically derived weights and a final WQS index through bootstrap sampling. The weights are constrained to sum to 1 and be between 0 and 1, and can be used to identify important (highly weighted) components and those with no association with outcome (components receiving zero or negligible weight). Inference is constrained in a single direction and the index is interpretable as a measure of the mixture effect.

Author(s)

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Maintainer: Jenna Czarnota <jennaczarnota@gmail.com>
References


Examples

data(WQSdata)
yNtrain <- WQSdata[, 'y']
xNtrain <- WQSdata[, -10]
output <- wqsNest(yNtrain, xNtrain, B = 10)

wqs.est

Weighted Quantile Sum Regression

Description

This function fits a weighted quantile sum regression model.

Usage

wqs.est(y.train, x.train, z.train = NULL, y.valid = y.train, x.valid = x.train, z.valid = z.train, n.quantiles = 4, B = 100, b1.pos = TRUE)

Arguments

y.train vector of the continuous explanatory variable from training data
x.train matrix of explanatory variables (to be combined into an index) from training data
z.train vector or matrix of covariates from training data
y.valid vector of the continuous explanatory variable from validation data
x.valid matrix of explanatory variables (to be combined into an index) from validation data
z.valid vector or matrix of covariates from validation data
n.quantiles number of quantiles to be used (needs to be between 2 and 10)
B number of bootstrap samples to be used in estimation (needs to be greater than 1)
b1.pos TRUE if the index is expected to be positively related to the outcome
**Value**

A list with the following items:

- `q.train`  
  matrix of quantiles for training data
- `q.valid`  
  matrix of quantiles for validation data
- `wts.matrix`  
  matrix of estimated weights; each row corresponds to a bootstrap sample
- `weights`  
  final estimated weights used in calculating the WQS index
- `wqs`  
  weighted quantile sum estimate based on calculated weights
- `fit`  
  WQS model fit to validation data

**Author(s)**

Jenna Czarnota, David Wheeler

**References**


**Examples**

```r
data(WQSdata)
y.train <- WQSdata[, 'y']
x.train <- WQSdata[, -10]
output <- wqs.est(y.train, x.train, B = 10)
```

---

**Description**

Correlation and concentration patterns were loosely based on NHL data.

**Usage**

```r
data("WQSdata")
```
WQSData

Format
A data frame with 1000 observations on the following 10 variables.

- X1 a numeric vector
- X2 a numeric vector
- X3 a numeric vector
- X4 a numeric vector
- X5 a numeric vector
- X6 a numeric vector
- X7 a numeric vector
- X8 a numeric vector
- X9 a numeric vector
- y a numeric vector; the outcome variable

Details
Correlation and concentration patterns were loosely based on NHL data.

References


Examples

data(WQSData)
Index

*Topic \textasciitilde kwd1
wqs.est, 3

*Topic \textasciitilde kwd2
wqs.est, 3

*Topic \texttt{datasets}
WQSdata, 4

*Topic \texttt{package}
wqs-package, 2

wqs (wqs-package), 2
wqs-package, 2
wqs.est, 3
WQSdata, 4