

Package ‘crwbmetareg’

July 22, 2025

Type Package

Title Cluster Robust Wild Bootstrap Meta Regression

Version 1.0

Date 2023-10-18

Author Michail Tsagris [aut, cre]

Maintainer Michail Tsagris <mtsagris@uoc.gr>

Depends R (>= 4.0)

Imports lmtest, Rfast2, sandwich, stats, utils

Suggests clusterSEs

Description In meta regression sometimes the studies have multiple effects that are correlated. For this reason cluster robust standard errors must be computed. However, since the clusters are unbalanced the wild bootstrap is suggested. See Oczkowski E. and Doucouliagos H. (2015). ``Wine prices and quality ratings: a meta-regression analysis". American Journal of Agricultural Economics, 97(1): 103--121. <doi:10.1093/ajae/aau057> and Cameron A. C., Gelbach J. B. and Miller D. L. (2008). ``Bootstrap-based improvements for inference with clustered errors". The Review of Economics and Statistics, 90(3): 414--427. <doi:10.1162/rest.90.3.414>.

License GPL (>= 2)

NeedsCompilation no

Repository CRAN

Date/Publication 2023-10-19 08:10:05 UTC

Contents

crwbmetareg-package	2
Column-wise weighted least squares meta analysis	3
FAT-PET test using cluster robust wild bootstrap	4
Meta regression using cluster robust wild bootstrap	5
Weighted least squares meta analysis	6

Index	8
--------------	----------

crwbmetareg-package *Cluster Robust Wild Bootstrap Meta Regression.*

Description

In meta regression sometimes the studies have multiple effects that are correlated. For this reason cluster robust standard errors must be computed. However, since the clusters are unbalanced the wild bootstrap is suggested.

Details

Package: crwbmetareg
Type: Package
Version: 1.0
Date: 2023-10-18
License: GPL-2

Maintainers

Michail Tsagris <mtsagris@uoc.gr>.

Author(s)

Michail Tsagris <mtsagris@uoc.gr>.

References

- Chatzimichael K., Daskalaki C., Emvalomatis G., Tsagris M. and Vangelis Tzouvelekas V. (2023). Factors Shaping Innovative Behavior: A Meta-Analysis of Technology Adoption Studies in Agriculture. <https://economics.soc.uoc.gr/el/market/998/factors-shaping-farmers-innovative-behavior-a-meta-analysis-of-technology-adoption-studies-in-agriculture>
- Oczkowski, E. and Doucouliagos, H. (2015). Wine prices and quality ratings: a meta-regression analysis. *American Journal of Agricultural Economics*, 97(1): 103-121.
- Cameron, A. C., Gelbach, J. B. and Miller, D. L. (2008). Bootstrap-based improvements for inference with clustered errors. *The Review of Economics and Statistics*, 90(3): 414-427.

Column-wise weighted least squares meta analysis

Column-wise weighted least squares meta analysis

Description

Column-wise weighted least squares meta analysis.

Usage

```
colwlsmeta(yi, vi)
```

Arguments

<code>yi</code>	A matrix with the observations.
<code>vi</code>	A matrix with the variances of the observations.

Details

The weighted least squares (WLS) meta analysis is performed in a column-wise fashion. This function is suitable for simulation studies, where one can perform multiple WLS meta analyses at once. See references for this.

Value

A vector with many elements. The fixed effects mean estimate, the $\bar{v}$ estimate, the I^2 , the H^2 , the Q test statistic and its p-value, the τ^2 estimate and the random effects mean estimate.

Author(s)

Michail Tsagris.

R implementation and documentation: Michail Tsagris <mtsagris@uoc.gr>.

References

Stanley T. D. and Doucouliagos H. (2015). Neither fixed nor random: weighted least squares meta-analysis. *Statistics in Medicine*, 34(13), 2116–2127.

Stanley, T. D. and Doucouliagos, H. (2017). Neither fixed nor random: Weighted least squares meta-regression. *Research synthesis methods*, 8(1): 19–42.

See Also

[wlsmeta](#)

Examples

```
y <- matrix( rnorm(50* 5), ncol = 5)
vi <- matrix( rexp(50* 5), ncol = 5)
colwlsmeta(y, vi)
wlsmeta(y[, 1], vi[, 1])
```

FAT-PET test using cluster robust wild bootstrap

FAT-PET test using cluster robust wild bootstrap

Description

FAT-PET test using cluster robust wild bootstrap.

Usage

```
fatpet(target, se, cluster, weights, boot.reps = 1000, prog.bar = FALSE, seed = NULL)
```

Arguments

target	A vector with the effect sizes.
se	A vector with the standard errors, or the variances, of the effect sizes.
cluster	A vector indicating the clusters.
weights	A vector with the inverse of the the variances of the effect sizes.
boot.reps	The number of bootstrap re-samples to generate.
prog.bar	If you want the progress bar to appear set this equal to TRUE.
seed	IF you want the results to be rerproducibile set this equal to TRUE.

Details

It implements the FAT-PET test using cluster robust wild bootstrap to compute the p-values. See references for this.

The function uses a modification of the function "cluster.wild.glm()" of the package "clusterSEs".

Value

A vector with two p-values. One for the constant and one for the coefficient of the "vse".

Author(s)

Michail Tsagris.

R implementation and documentation: Michail Tsagris <mtsagris@uoc.gr>.

References

- Oczkowski, E. and Doucouliagos, H. (2015). Wine prices and quality ratings: a meta-regression analysis. *American Journal of Agricultural Economics*, 97(1): 103–121.
- Cameron, A. C., Gelbach, J. B. and Miller, D. L. (2008). Bootstrap-based improvements for inference with clustered errors. *The Review of Economics and Statistics*, 90(3): 414–427.

See Also

[crwbmetareg](#)

Examples

```
y <- rnorm(50)
se <- rexp(50, 3)
cluster <- sample(1:20, 50, replace = TRUE)
fatpet(y, se, cluster, weights = se^2, boot.reps = 500)
```

Meta regression using cluster robust wild bootstrap

Meta regression using cluster robust wild bootstrap

Description

Meta regression using cluster robust wild bootstrap.

Usage

```
crwbmetareg(target, se, dataset, cluster, weights, boot.reps = 1000,
  prog.bar = FALSE, seed = NULL)
```

Arguments

target	A vector with the effect sizes.
se	A vector with the standard errors, or the variances, of the effect sizes.
dataset	A matrix or data.frame with the independent variables.
cluster	A vector indicating the clusters.
weights	A vector with the inverse of the the variances of the effect sizes.
boot.reps	The number of bootstrap re-samples to generate.
prog.bar	If you want the progress bar to appear set this equal to TRUE.
seed	IF you want the results to be reproducible set this equal to TRUE.

Details

It implements metaregression using cluster robust wild bootstrap to compute the p-values. See references for this.

The function uses a modification of the function "cluster.wild.glm()" of the package "clusterSEs".

Value

A vector with two p-values. One for the constant and one for the coefficient of the "se".

Author(s)

Michail Tsagris.

R implementation and documentation: Michail Tsagris <mtsagris@uoc.gr>.

References

Oczkowski, E. and Doucouliagos, H. (2015). Wine prices and quality ratings: a meta-regression analysis. *American Journal of Agricultural Economics*, 97(1): 103–121.

Cameron, A. C., Gelbach, J. B. and Miller, D. L. (2008). Bootstrap-based improvements for inference with clustered errors. *The Review of Economics and Statistics*, 90(3): 414–427.

See Also

[fatpet](#)

Examples

```
y <- rnorm(50)
se <- rexp(50, 3)
cluster <- sample(1:20, 50, replace = TRUE)
dataset <- matrix( rnorm(50 * 2), ncol = 2 )
fatpet(y, se, dataset, cluster, weights = se^2, boot.reps = 100)
```

Weighted least squares meta analysis

Weighted least squares meta analysis

Description

Weighted least squares meta analysis.

Usage

```
wlsmeta(yi, vi)
```

Arguments

<code>yi</code>	The observations.
<code>vi</code>	The variances of the observations.

Details

It implements weighted least squares (WLS) meta analysis. See references for this.

Value

A vector with many elements. The fixed effects mean estimate, the $\bar{v}$ estimate, the I^2 , the H^2 , the Q test statistic and its p-value, the τ^2 estimate and the random effects mean estimate.

Author(s)

Michail Tsagris.

R implementation and documentation: Michail Tsagris <mtsagris@uoc.gr>.

References

Stanley T. D. and Doucouliagos H. (2015). Neither fixed nor random: weighted least squares meta-analysis. *Statistics in Medicine*, 34(13): 2116–2127.

Stanley, T. D. and Doucouliagos, H. (2017). Neither fixed nor random: Weighted least squares meta-regression. *Research synthesis methods*, 8(1): 19–42.

See Also

[colwlsmeta](#)

Examples

```
y <- rnorm(30)
vi <- rexp(30, 3)
wlsmeta(y, vi)
```

Index

Column-wise weighted least squares
 meta analysis, [3](#)
`colwlsmeta`, [7](#)
`colwlsmeta` (Column-wise weighted least
 squares meta analysis), [3](#)
`crwbmetareg`, [5](#)
`crwbmetareg` (Meta regression using
 cluster robust wild
 bootstrap), [5](#)
`crwbmetareg`-package, [2](#)

FAT-PET test using cluster robust wild
 bootstrap, [4](#)
`fatpet`, [6](#)
`fatpet` (FAT-PET test using cluster
 robust wild bootstrap), [4](#)

Meta regression using cluster robust
 wild bootstrap, [5](#)

Weighted least squares meta analysis, [6](#)
`wlsmeta`, [3](#)
`wlsmeta` (Weighted least squares meta
 analysis), [6](#)