# Package 'concstats'

October 12, 2026

**Type** Package

**Title** Market Structure, Concentration and Inequality Measures

**Version** 0.2.1

**Description** Based on individual market shares of all participants in a market or space, the package offers a set of different structural and concentration measures frequently - and not so frequently - used in research and in practice. Measures can be calculated in groups or individually. The calculated measure or the resulting vector in table format should help practitioners make more informed decisions. Methods used in this package are from:
1. Chang, E. J., Guerra, S. M., de Souza Penaloza, R. A. & Tabak, B. M. (2005) ``Banking concentration: the Brazilian case".
2. Cobham, A. and A. Summer (2013). ``Is It All About the Tails? The Palma Measure of Income Inequality".
3. Garcia Alba Idunate, P. (1994). ``Un Indice de dominancia para el analisis de la estructura de los mercados".
4. Ginevicius, R. and S. Cirba (2009). ``Additive measurement of market concentration" <doi:10.3846/1611-1699.2009.10.191-198>.
5. Herfindahl, O. C. (1950), ``Concentration in the steel industry" (PhD thesis).
6. Hirschmann, A. O. (1945), ``National power and structure of foreign trade".
7. Melnik, A., O. Shy, and R. Stenbacka (2008), ``Assessing market dominance" <doi:10.1016/j.jebo.2008.03.010>.
8. Palma, J. G. (2006). ``Globalizing Inequality: 'Centrifugal' and 'Centripetal' Forces at Work".
9. Shannon, C. E. (1948). ``A Mathematical Theory of Communication".
10. Simpson, E. H. (1949). ``Measurement of Diversity" <doi:10.1038/163688a0>.

**License** GPL (>= 3)

**URL** https://github.com/ropensci/concstats/, https://docs.ropensci.org/concstats/ (website)

**BugReports** https://github.com/ropensci/concstats/issues/

**Depends** R (>= 4.1.0)

**Imports** checkmate, stats, tibble

**Suggests** rmarkdown, knitr, dplyr, devtools, kableExtra, ggplot2, testthat (>= 3.0.0), covr

**VignetteBuilder** knitr, rmarkdown

**Encoding** UTF-8

**Language** en-US

**LazyData** true

**Config/testthat/edition** 3

**Config/roxygen2/version** 8.1.1

**NeedsCompilation** no

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**Repository** CRAN

**Date/Publication** 2026-10-12 12:50:02 UTC

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---

`concstats_all_comp` *A wrapper for the proposed concentration measures*

---

## Description

A wrapper for the proposed concentration measures

## Usage

```
concstats_all_comp(x, normalized = FALSE, na.rm = TRUE, digits = NULL)
```

## Arguments

| | |
|---|---|
| `x` | A non-negative numeric vector. The computation yields `NA` if `NA` values are present. |
| `normalized` | Logical. Argument specifying whether or not a normalized value is required. Must be either `TRUE` or `FALSE`. Defaults to `FALSE`. |
| `na.rm` | A logical vector that indicates whether `NA` values should be excluded or not. Must be either `TRUE` or `FALSE`. The default is `TRUE`. If set to `FALSE` the computation yields `NA` if vector contains `NA` values. |
| `digits` | An optional value for digits. Specifies the minimum number of significant digits to be printed in values. |

## Details

`concstats_all_comp` returns all proposed group measures in a one step procedure with default settings if not otherwise specified.

## Value

A `data.frame`.

## See Also

`concstats_all_mstruct()`, `concstats_all_inequ()`

Other Competition/Concentration measures: `concstats_comp()`, `concstats_dom()`, `concstats_hhi()`, `concstats_hhi_d()`, `concstats_hhi_min()`, `concstats_sten()`

## Examples

```
# a vector of market shares
x <- c(0.35, 0.4, 0.05, 0.1, 0.06, 0.04)
concstats_all_comp(x, digits = 2)
```

---

concstats_all_inequ *A wrapper for the proposed inequality measures*

---

## Description

A wrapper for the proposed inequality measures

## Usage

```
concstats_all_inequ(x, normalized = TRUE, na.rm = TRUE, digits = NULL)
```

## Arguments

| | |
|---|---|
| x | A non-negative numeric vector. |
| normalized | Logical. Argument specifying whether or not a normalized value is required. Must be either TRUE or FALSE. The default is FALSE. |
| na.rm | A logical vector that indicates whether NA values should be excluded or not. Must be either TRUE or FALSE. The default is TRUE. If set to FALSE the computation yields NA if NA values are present. |
| digits | An optional value for digits. Specifies the minimum number of significant digits to be printed in values. The default is NULL and will use base R print option. |

## Details

concstats_all_inequ returns all proposed group measures in a one step procedure with default settings if not otherwise specified.

## Value

A data.frame.

## See Also

concstats_all_mstruct(), concstats_all_comp()

Other Concentration and inequality measures: concstats_entropy(), concstats_gini(), concstats_grs(), concstats_inequ(), concstats_palma(), concstats_simpson()

## Examples

```
# a vector of market shares
x <- c(0.35, 0.4, 0.05, 0.1, 0.06, 0.04)
concstats_all_inequ(x, digits = 2)
```

concstats_all_mstruct *A wrapper for the proposed structural measures*

## Description

A wrapper for the proposed structural measures

## Usage

```
concstats_all_mstruct(x, na.rm = TRUE, digits = NULL)
```

## Arguments

| | |
|---|---|
| x | A non-negative numeric vector. |
| na.rm | A logical vector that indicates whether NA values should be excluded or not. Must be either TRUE or FALSE. The default is TRUE. If set to FALSE the computation yields NA if the vector contains NA values. |
| digits | An optional value for digits. Specifies the minimum number of significant digits to be printed in values. The default is NULL and will use base R print option. |

## Details

concstats_all_mstruct returns all proposed group measures in a one step procedure with default settings if not otherwise specified.

## Value

A data.frame.

## See Also

concstats_all_comp(), concstats_all_inequ()

Other Market structure measures: concstats_firm(), concstats_mstruct(), concstats_nrs_eq(), concstats_top(), concstats_top3(), concstats_top3_df(), concstats_top5(), concstats_top5_df(), concstats_top_df()

## Examples

```
# a vector of market shares
x <- c(0.4, 0.2, 0.25, 0.1, 0.05)
concstats_all_mstruct(x, digits = 2)
```

concstats_comp *Group of Concentration Measures*

## Description

A set of different concentration and competition measures.

## Usage

```
concstats_comp(x, normalized = FALSE, type = c("hhi", "hhi_d", "hhi_min",
 "dom", "sten", "all"), na.rm = TRUE, digits = NULL)
```

## Arguments

| | |
|---|---|
| x | A non-negative numeric vector. |
| normalized | Logical. Argument specifying whether or not a normalized value is required. Ranges from {0, 1} and often used for comparison over time. Must be either TRUE or FALSE. The default is FALSE. |
| type | A character string of the measure to be calculated, can be abbreviated with the first letter. Defaults to "hhi". Input is not case-sensitive. |
| na.rm | A logical vector that indicates whether NA values should be excluded or not. If set to FALSE the computation yields NA if vector contains NA values. Must be either TRUE or FALSE. Defaults to TRUE and NAs will be removed for further computations with a message. |
| digits | A non-null value for digits specifies the minimum number of significant digits to be printed in values. The default is NULL and will use base R print option. Significant digits defaults to 7. Values are restricted between 1 and default value. |

## Details

- concstats_comp is a wrapper for the proposed concentration measures. All measures can be accessed individually.
- concstats_hhi() returns the Herfindahl-Hirschman index (HHI). concstats_hhi, can be calculated individually as a normalized measure changing the default setting to TRUE.
- concstats_hhi_d() returns the dual of the HHI.
- concstats_hhi_min() calculates the minimum of the HHI index.
- concstats_dom() calculates the dominance index.
- concstats_sten() calculates the stenbacka index.
- concstats_all_comp() is a wrapper that computes all measures in a one step procedure. For more details or references please see the help page of the respective function.

## Value

A single numeric measure in decimal form or data frame.

### Note

The vector of market shares should be in a decimal form corresponding to total shares of individual firms/units. The vector should sum up to 1. Alternatively, the user might use `concstats_shares()` to converting raw variables, e.g. loans or sales into shares.

### See Also

`concstats_concstats()`, `concstats_mstruct()`, `concstats_inequ()`

Other Competition/Concentration measures: `concstats_all_comp()`, `concstats_dom()`, `concstats_hhi()`, `concstats_hhi_d()`, `concstats_hhi_min()`, `concstats_sten()`

### Examples

```
# a vector of market shares
x <- c(0.35, 0.4, 0.05, 0.1, 0.06, 0.04)

# the Herfindahl-Hirschman index of the vector
concstats_comp(x, type = "hhi")

# individual measure
concstats_sten(x)

# complete group measures
concstats_comp(x, type = "all", digits = 2)
```

---

## concstats_concstats *A set of Market Structure, Concentration, and Inequality Measures*

---

### Description

A convenience function which calculates a selected set of different market structure, inequality and concentration measures more or less commonly used, e.g. k-firm ratios, Entropy, HHI, Palma ratio, and others in a one step procedure to provide a first overview.

### Usage

```
concstats_concstats(x, na.rm = TRUE, digits = NULL)
```

### Arguments

| | |
|---|---|
| `x` | A non-negative numeric vector. |
| `na.rm` | A logical vector that indicates whether `NA` values should be excluded or not. Must be either `TRUE` or `FALSE`. Defaults to `TRUE`. If set to `FALSE` the computation yields `NA` if vector contains `NA` values. |
| `digits` | A non-null value for digits specifies the minimum number of significant digits to be printed in values. The default is `NULL` and will use base R print option. |

## Details

concstats_concstats computes a set of different and selected structural, inequality, and concentration measures in a one step procedure. The resulting data frame contains eight measures: number of firms with market share, numbers equivalent, the cumulative share of the top (top 3 and top 5) firm(s) in percentage, the hhi index, the entropy index, and the palma ratio. However, all measures can be computed individually or in groups.

## Value

A data frame of numeric measures with default settings from the respective individual measure.

## Note

The vector of market shares should be in a decimal form corresponding to the total share of individual firms/units. The vector should sum up to 1, otherwise a numeric vector will be converted into decimal form.

## See Also

concstats_mstruct(), concstats_comp(), concstats_inequ()

## Examples

```
# a vector of market shares
x <- c(0.35, 0.4, 0.05, 0.1, 0.06, 0.04)
# a selected set of different structural, concentration, and inequality
# measures
concstats_concstats(x, digits = 2)
```

---

# concstats_dom *Dominance Index*

---

## Description

An alternative measure which can be used in case of mergers.

## Usage

```
concstats_dom(x, na.rm = TRUE, digits = NULL)
```

## Arguments

| | |
|---|---|
| x | A non-negative numeric vector. |
| na.rm | A logical vector that indicates whether NA values should be excluded or not. Must be either TRUE or FALSE. The default is TRUE. If set to FALSE the computation yields a warning if the vector contains NA values. NAs will be removed for further computations. |

digits An optional value for digits. Specifies the minimum number of significant digits to be printed in values. The default is NULL and will use base R print option.

## Details

concstats_dom calculates a dominance index, which measures the concentration within the Herfindahl-Hirschman index, that is, the concentration within the concentration.

## Value

A single numeric measure in decimal form or, if NAs are present, with a warning.

## References

Garcia Alba Idunate, P. (1994). "Un Indice de dominancia para el analisis de la estructura de los mercados". *El Trimestre Economico*, 61: 499-524.

## See Also

Other Competition/Concentration measures: concstats_all_comp(), concstats_comp(), concstats_hhi(), concstats_hhi_d(), concstats_hhi_min(), concstats_sten()

## Examples

```
# a vector of market shares
x <- c(0.35, 0.4, 0.05, 0.1, 0.06, 0.04)
concstats_dom(x, na.rm = FALSE, digits = 2)

# a vector with NA values
x <- c(0.4, 0.2, 0.25, 0.1, 0.05, NA)
concstats_dom(x, digits = 2)
```

---

# concstats_entropy *Shannon Entropy*

---

## Description

Shannon Entropy

## Usage

```
concstats_entropy(x, normalized = TRUE, na.rm = TRUE, digits = NULL)
```

### Arguments

| | |
|---|---|
| x | A non-negative numeric vector. |
| normalized | Logical. Argument specifying whether or not a normalized value is required. Must be either TRUE or FALSE. The default is TRUE. |
| na.rm | A logical vector that indicates whether NA values should be excluded or not. Must be either TRUE or FALSE. The default is TRUE. If set to FALSE the computation yields NA if NA values are present. |
| digits | An optional value for digits. Specifies the minimum number of significant digits to be printed in values. The default is NULL and will use base R print option. |

### Value

A single numeric measure.

### References

Shannon, C. E. (1948). "A Mathematical Theory of Communication", *The Bell System Technical Journal* (Nokia Bell Labs).

### See Also

Other Concentration and inequality measures: concstats_all_inequ(), concstats_gini(), concstats_grs(), concstats_inequ(), concstats_palma(), concstats_simpson()

### Examples

```
# a vector of market shares
x <- c(0.4, 0.2, 0.25, 0.1, 0.05)
concstats_entropy(x, normalized = TRUE)

# a vector with NA values
x <- c(0.4, 0.2, 0.25, 0.1, 0.05, NA)
concstats_entropy(x, na.rm = TRUE, digits = 2)
```

---

## concstats_firm *Number of firms*

---

### Description

Number of firms

### Usage

```
concstats_firm(x, na.rm = TRUE)
```

### Arguments

| | |
|---|---|
| x | A non-negative numeric vector. |
| na.rm | A logical vector that indicates whether NA values should be excluded or not. Must be either TRUE or FALSE. The default is TRUE. If set to FALSE the computation yields a message if the vector contains NA values. NAs will be removed for further computations. |

### Value

A positive integer.

### See Also

Other Market structure measures: concstats_all_mstruct(), concstats_mstruct(), concstats_nrs_eq(), concstats_top(), concstats_top3(), concstats_top3_df(), concstats_top5(), concstats_top5_df(), concstats_top_df()

### Examples

```
# a vector of market shares
x <- c(0.4, 0.2, 0.25, 0.1, 0.05)
concstats_firm(x)
```

---

## concstats_gini *Gini coefficient*

---

### Description

Gini coefficient

### Usage

```
concstats_gini(x, normalized = TRUE, na.rm = TRUE, digits = NULL)
```

### Arguments

| | |
|---|---|
| x | A non-negative numeric vector. |
| normalized | Logical. Argument specifying whether or not a normalized value is required. Must be either TRUE or FALSE. The default is TRUE. |
| na.rm | A logical vector that indicates whether NA values should be excluded or not. Must be either TRUE or FALSE. The default is TRUE. If set to FALSE the computation yields NA if NA values are present. |
| digits | An optional value for digits. Specifies the minimum number of significant digits to be printed in values. The default is NULL and will use base R print option. Significant digits defaults to 7. Values are restricted between 1 and default value. |

## Value

A single numeric value.

## See Also

Other Concentration and inequality measures: concstats_all_inequ(), concstats_entropy(), concstats_grs(), concstats_inequ(), concstats_palma(), concstats_simpson()

## Examples

```
# a vector of market shares
x <- c(0.4, 0.2, 0.25, 0.1, 0.05)
concstats_gini(x, normalized = TRUE)

# a vector with NA values
x <- c(0.4, 0.2, 0.25, 0.1, 0.05, NA)
concstats_gini(x, na.rm = TRUE, digits = 2)
```

---

# concstats_grs *GRS measure*

---

## Description

GRS measure

## Usage

```
concstats_grs(x, na.rm = TRUE, digits = NULL)
```

## Arguments

| | |
|---|---|
| x | A non-negative numeric vector. |
| na.rm | A logical vector that indicates whether NA values should be excluded or not. Must be either TRUE or FALSE. The default is TRUE. If set to FALSE the computation yields a message if the vector contains NA values. NAs will be removed for further computations. |
| digits | An optional value for digits. Specifies the minimum number of significant digits to be printed in values. The default is NULL and will use base R print option. |

## Value

A single numeric value.

## References

Ginevicius, R. and S. Cirba (2009). "Additive measurement of market concentration", *Journal of Business Economics and Management*, 10(3), 191-198.

## See Also

Other Concentration and inequality measures: concstats_all_inequ(), concstats_entropy(), concstats_gini(), concstats_inequ(), concstats_palma(), concstats_simpson()

## Examples

```
# a vector of market shares
x <- c(0.4, 0.3, 0.2, 0.1)
concstats_grs(x, digits = 3)
#[1] 0.398

# a vector with NA values
x <- c(0.4, 0.2, 0.25, 0.1, 0.05, NA)
concstats_grs(x, na.rm = FALSE)
```

---

# concstats_hhi *Herfindahl-Hirschman Index*

---

## Description

A measure of industry concentration and widely used in merger control.

## Usage

```
concstats_hhi(x, normalized = FALSE, na.rm = TRUE, digits = NULL)
```

## Arguments

| | |
|---|---|
| x | A non-negative numeric vector. |
| normalized | Logical. Argument specifying whether or not a normalized value is required. Must be either TRUE or FALSE. The default is FALSE. |
| na.rm | A logical vector that indicates whether NA values should be excluded or not. Must be either TRUE or FALSE. The default is TRUE. If set to FALSE the computation yields a message if the vector contains NA values. NAs will be removed for further computations. |
| digits | A non-null value for digits specifies the minimum number of significant digits to be printed in values. The default is NULL and will use base R print option. |

## Details

concstats_hhi calculates the widely used Herfindahl-Hirschman Index (Herfindahl, 1950 and Hirschman, 1945). The index is calculated by squaring the market share of each firm competing in the market and then summing the resulting numbers.

## Value

A single numeric measure in decimal form.

## References

Herfindahl, O. C. (1950), "Concentration in the steel industry" (PhD thesis), Columbia University.

Hirschman, A. O. (1945), "National power and structure of foreign trade". Berkeley, CA: University of California Press.

## See Also

Other Competition/Concentration measures: concstats_all_comp(), concstats_comp(), concstats_dom(), concstats_hhi_d(), concstats_hhi_min(), concstats_sten()

## Examples

```
# a vector of market shares
x <- c(0.35, 0.4, 0.05, 0.1, 0.06, 0.04)
concstats_hhi(x, digits = 2)

# a vector with NA values
x <- c(0.4, 0.2, 0.25, 0.1, 0.05, NA)
concstats_hhi(x, na.rm = TRUE)
```

---

# concstats_hhi_d *Dual of the Herfindahl-Hirschman Index*

---

## Description

The dual of the HHI reflects the fraction of participants that do have market participation.

## Usage

```
concstats_hhi_d(x, na.rm = TRUE, digits = NULL)
```

## Arguments

| | |
|---|---|
| x | A non-negative numeric vector. |
| na.rm | A logical vector that indicates whether NA values should be excluded or not. Must be either TRUE or FALSE. The default is TRUE. If set to FALSE the computation yields a message if the vector contains NA values. NAs will be removed for further computations. |
| digits | A non-null value for digits specifies the minimum number of significant digits to be printed in values. The default is NULL and will use base R print option. |

## Details

concstats_hhi_d is the dual of the HHI index, which indicates the percentage which represents the fraction of the banks that do not have market participation.

## Value

A single numeric value.

## References

Chang, E. J., Guerra, S. M., de Souza Penaloza, R. A. & Tabak, B. M. (2005) Banking concentration: the Brazilian case. *In Financial Stability Report*. Brasilia: Banco Central do Brasil, 4: 109-129.

## See Also

Other Competition/Concentration measures: `concstats_all_comp()`, `concstats_comp()`, `concstats_dom()`, `concstats_hhi()`, `concstats_hhi_min()`, `concstats_sten()`

## Examples

```
# a vector of market shares
x <- c(0.35, 0.4, 0.05, 0.1, 0.06, 0.04)
concstats_hhi_d(x)

# a vector with NA values
x <- c(0.4, 0.2, 0.25, 0.1, 0.05, NA)
concstats_hhi_d(x, na.rm = TRUE, digits = 2)
```

---

# concstats_hhi_min *Minimum of Herfindahl-Hirschman Index*

---

## Description

Minimum of Herfindahl-Hirschman Index

## Usage

```
concstats_hhi_min(x, na.rm = TRUE, digits = NULL)
```

## Arguments

| | |
|---|---|
| `x` | A non-negative numeric vector. |
| `na.rm` | A logical vector that indicates whether `NA` values should be excluded or not. Must be either `TRUE` or `FALSE`. The default is `TRUE`. If set to `FALSE` the computation yields a message if the vector contains `NA` values. NAs will be removed for further computations. |
| `digits` | A non-null value for digits specifies the minimum number of significant digits to be printed in values. The default is `NULL` and will use base R print option. |

## Details

Calculates the minimum of the Herfindahl-Hirschman index, that is, the equivalent of all participants in the market with equal market shares.

## Value

A single numeric measure in decimal form.

## See Also

Other Competition/Concentration measures: concstats_all_comp(), concstats_comp(), concstats_dom(), concstats_hhi(), concstats_hhi_d(), concstats_sten()

## Examples

```
# a vector of market shares
x <- c(0.35, 0.4, 0.05, 0.1, 0.06, 0.04)
concstats_hhi_min(x, digits = 2)

# a vector with NA values
x <- c(0.4, 0.2, 0.25, 0.1, 0.05, NA)
concstats_hhi_min(x, na.rm = FALSE)
```

---

# concstats_inequ *Inequality and Diversity Measures*

---

## Description

A set of different inequality and diversity measures.

## Usage

```
concstats_inequ(x, normalized = TRUE, type = c("entropy", "gini",
 "simpson", "palma", "grs", "all"), na.rm = TRUE, digits = NULL)
```

## Arguments

| | |
|---|---|
| x | A non-negative numeric vector. |
| normalized | Logical. Argument of the functions concstats_entropy, concstats_gini specifying whether or not a normalized value is required. Must be either TRUE or FALSE. The default is TRUE. |
| type | A character string of the measure to be calculated, defaults to concstats_entropy. Input is not case-sensitive. |
| na.rm | A logical vector that indicates whether NA values should be excluded or not. Must be either TRUE or FALSE. The default is TRUE. If set to FALSE the computation yields a message if the vector contains NA values. NAs will be removed for further computations. |

digits — A non-null value for digits specifies the minimum number of significant digits to be printed in values. The default is NULL and will use base R print option. Significant digits defaults to 7. Values are restricted between 1 and default value.

## Details

- concstats_inequ is a wrapper for the proposed inequality measures. All measures can be accessed individually.
- concstats_entropy() returns the Shannon entropy. concstats_entropy You can normalize the entropy measures by setting normalized = TRUE.
- concstats_gini() calculates the gini coefficient. concstats_gini You can normalize the gini measures by setting normalized = TRUE.
- concstats_simpson() calculates the gini-simpson index.
- concstats_palma() calculates the palma ratio of inequality.
- concstats_grs() calculates an alternative concentration measure.
- concstats_all_inequ() returns all measures in a one step procedure. For more details or references please see the help page of the respective function.

## Value

The calculated numeric measure or a data frame

## See Also

concstats_concstats(),concstats_mstruct(),concstats_comp()

Other Concentration and inequality measures: concstats_all_inequ(), concstats_entropy(), concstats_gini(), concstats_grs(), concstats_palma(), concstats_simpson()

## Examples

```
# a vector of market shares
x <- c(0.4, 0.2, 0.25, 0.1, 0.05)

# Calculate the Palma ratio
concstats_inequ(x, type = "palma")

# Calculate the entropy measure directly
concstats_inequ(x, normalized = TRUE, type = "entropy")

# Calculate the group measures
concstats_inequ(x, type = "all", digits = 2)
```

concstats_mstruct *Market Structure Measures*

## Description

Set of different market structure measures to reflect a given market structure.

## Usage

```
concstats_mstruct(x, type = c("firm", "nrs_eq", "top", "top3", "top5",
 "all"), na.rm = TRUE, digits = NULL)
```

## Arguments

| | |
|---|---|
| x | A non-negative numeric vector. |
| type | A character string of the measure to be calculated, can be abbreviated with the first letter. Defaults to "firm". Input is not case-sensitive. |
| na.rm | A logical vector that indicates whether NA values should be excluded or not. Must be either TRUE or FALSE. The default is TRUE. If set to TRUE the computation yields a message if the vector contains NA values. NAs will be removed for further computations. If set to FALSE with NAs present the computation yield NA. |
| digits | A non-null value for digits specifies the minimum number of significant digits to be printed in values. The default is NULL and will use base R print option. Significant digits defaults to 7. Values are restricted between 1 and default value. |

## Details

- concstats_mstruct is a wrapper for the proposed structural measures.
- concstats_firm(), returns the number of firms with a given market share.
- concstats_nrs_eq() computes the reciprocal of the HHI, which indicates the equivalent number of firms of the same size.
- concstats_top(), concstats_top3(), and concstats_top5() calculate the cumulative share of the top (top 3 and top 5) firm(s) and returns the value in percentage.
- concstats_all_mstruct() computes all measures in a one step procedure. All measures can be computed individually.
- concstats_top_df(), concstats_top3_df(), and concstats_top5_df() are slight variations. Firm id or ranking might be of interest. In this case an additional id or firm variable is needed. The functions will return a data frame. These functions are just individually accessible.

## Value

A single calculated numeric measure or data frame.

## Note

The vector of market shares should be in a decimal form corresponding to total shares of individual firms/units. The sum of the vector should sum up to 1. Alternatively, the user might use concstats_shares() to converting raw variables, e.g. loans or sales into shares.

## See Also

concstats_concstats(),concstats_comp(),concstats_inequ()

Other Market structure measures: concstats_all_mstruct(), concstats_firm(), concstats_nrs_eq(), concstats_top(), concstats_top3(), concstats_top3_df(), concstats_top5(), concstats_top5_df(), concstats_top_df()

## Examples

```
# a vector of market shares
x <- c(0.35, 0.4, 0.05, 0.1, 0.06, 0.04)
concstats_mstruct(x, type = "firm", digits = 1)

# Calculate the market structure group measures
concstats_mstruct(x, type = "all", digits = 2)
```

---

# concstats_nrs_eq *Numbers equivalent*

---

## Description

Numbers equivalent

## Usage

```
concstats_nrs_eq(x, na.rm = TRUE, digits = NULL)
```

## Arguments

| | |
|---|---|
| x | A non-negative numeric vector. |
| na.rm | A logical vector that indicates whether NA values should be excluded or not. Must be either TRUE or FALSE. The default is TRUE. If set to FALSE the computation yields NA if NA values are present. |
| digits | An optional value for digits. Specifies the minimum number of significant digits to be printed in values. The default is NULL and will use base R print option. |

## Value

A positive numeric value, rounded to the second decimal place.

## See Also

Other Market structure measures: concstats_all_mstruct(), concstats_firm(), concstats_mstruct(), concstats_top(), concstats_top3(), concstats_top3_df(), concstats_top5(), concstats_top5_df(), concstats_top_df()

## Examples

```
# a vector of market shares
x <- c(0.4, 0.2, 0.25, 0.1, 0.05)
concstats_nrs_eq(x, digits = 2)
```

---

# concstats_palma *Palma ratio*

---

## Description

The Palma ratio is an alternative to the Gini index. The ratio focuses on the differences between those in the top and bottom income brackets.

## Usage

```
concstats_palma(x, na.rm = TRUE, digits = NULL)
```

## Arguments

| | |
|---|---|
| x | A non-negative numeric vector. |
| na.rm | A logical vector that indicates whether NA values should be excluded or not. Must be either TRUE or FALSE. The default is TRUE. If set to FALSE the computation yields a message if the vector contains NA values. NAs will be removed for further computations. |
| digits | An optional value for digits. Specifies the minimum number of significant digits to be printed in values. The default is NULL and will use base R print option. |

## Details

concstats_palma measures the ratio of inequality (normally used with income inequality) of the top 10 percent to the bottom 40 percent.

## Value

A single numeric measure.

## References

Palma, J. G. (2006). "Globalizing Inequality: 'Centrifugal' and 'Centripetal' Forces at Work", DESA Working Paper No. 35.

## See Also

Other Concentration and inequality measures: concstats_all_inequ(), concstats_entropy(), concstats_gini(), concstats_grs(), concstats_inequ(), concstats_simpson()

## Examples

```
# a vector of market shares
x <- c(0.4, 0.2, 0.25, 0.1, 0.05)
concstats_palma(x)

concstats_palma(x, digits = 2)

# a vector with NA values
x <- c(0.4, 0.2, 0.25, 0.1, 0.05, NA)
concstats_palma(x, na.rm = FALSE)
```

---

# concstats_shares *shares*

---

## Description

The concstats_shares function is a helper function making it easier to convert numeric variable into individual shares. This might be convenient for larger vectors.

## Usage

```
concstats_shares(x, na.rm = TRUE, digits = NULL)
```

## Arguments

| | |
|---|---|
| x | A non-negative numeric vector. |
| na.rm | A logical vector that indicates whether NA values should be excluded or not. Must be either TRUE or FALSE. The default is TRUE. If set to FALSE the computation yields a message if the vector contains NA values. NAs will be removed for further computations. |
| digits | An optional value for digits. Specifies the minimum number of significant digits to be printed in values. The default is NULL and will use base R print option. |

## Details

concstats_shares is a helper function. The user can manually convert or provide numerical vectors of shares or use constats_shares.

## Value

A numeric vector in decimal form.

## Examples

```
# a vector of loans (without special characters, e.g. currency symbols)
x <- c(538572286.08, 481096.77, 161914143.03, 128796268.59, 69055940.72)
concstats_shares(x)

# a vector with NA values
x2 <- c(538572286.08, 481096.77, 161914143.03, 128796268.59, 69055940.72, NA)
concstats_shares(x2, na.rm = TRUE, digits = 3)
```

---

`concstats_simpson` *Gini-Simpson Index*

---

## Description

Gini-Simpson Index

## Usage

```
concstats_simpson(x, na.rm = TRUE, digits = NULL)
```

## Arguments

| | |
|---|---|
| `x` | A non-negative numeric vector. |
| `na.rm` | A logical vector that indicates whether `NA` values should be excluded or not. Must be either `TRUE` or `FALSE`. The default is `TRUE`. If set to `FALSE` the computation yields a message if the vector contains `NA` values. NAs will be removed for further computations. |
| `digits` | An optional value for digits. Specifies the minimum number of significant digits to be printed in values. The default is `NULL` and will use base R print option. |

## Details

`concstats_simpson` is the Gini-Simpson index, also known as the Gini impurity (Gini's diversity index) in Machine Learning, Gibbs-Martin index or Blau index in sociology and management studies. This index ranges from $\{0, 1\}$.

## Value

A single numeric value in decimal form.

## References

Simpson, E. H. (1949). "Measurement of Diversity", *Nature*, 163, 688.

Jost, L. (2006). "Entropy and Diversity". *Oikos*, 113(2), 363-375.

## See Also

Other Concentration and inequality measures: concstats_all_inequ(), concstats_entropy(), concstats_gini(), concstats_grs(), concstats_inequ(), concstats_palma()

## Examples

```
# a vector of market shares
x <- c(0.4, 0.2, 0.25, 0.1, 0.05)
concstats_simpson(x)

concstats_simpson(x, digits = 2)

# a vector with NA values
x <- c(0.4, 0.2, 0.25, 0.1, 0.05, NA)
concstats_simpson(x, na.rm = TRUE)
```

---

# concstats_sten *Stenbacka Index*

---

## Description

The measure suggests an approach that classifies when an individual firm has a dominant position and therefore assesses market dominance.

## Usage

```
concstats_sten(x, na.rm = TRUE, digits = NULL)
```

## Arguments

| | |
|---|---|
| x | A non-negative numeric vector. |
| na.rm | A logical vector that indicates whether NA values should be excluded or not. Must be either TRUE or FALSE. The default is TRUE. If set to FALSE the computation yields a message if the vector contains NA values. NAs will be removed for further computations. |
| digits | An optional value for digits. Specifies the minimum number of significant digits to be printed in values. The default is NULL and will use base R print option. |

## Details

concstats_sten calculates the Stenbacka index, which indicates the market share of a dominant position.

## Value

A single numeric measure in decimal form.

## References

Melnik, A., Shy, Oz, Stenbacka, R., (2008), "Assessing market dominance", *Journal of Economic Behavior and Organization*, 68: pp. 63-72.

## See Also

Other Competition/Concentration measures: `concstats_all_comp()`, `concstats_comp()`, `concstats_dom()`, `concstats_hhi()`, `concstats_hhi_d()`, `concstats_hhi_min()`

## Examples

```
# a vector of market shares
x <- c(0.35, 0.4, 0.05, 0.1, 0.06, 0.04)
concstats_sten(x, digits = 2)

concstats_sten(x, digits = 3)

# a vector with NA values
x <- c(0.4, 0.2, 0.25, 0.1, 0.05, NA)
concstats_sten(x, na.rm = TRUE)
```

---

`concstats_top` *Top market share*

---

## Description

Top market share

## Usage

```
concstats_top(x, na.rm = TRUE, digits = NULL)
```

## Arguments

| | |
|---|---|
| `x` | A non-negative numeric vector. |
| `na.rm` | A logical vector that indicates whether `NA` values should be excluded or not. Must be either `TRUE` or `FALSE`. The default is `TRUE`. If set to `FALSE` the computation yields a message if the vector contains `NA` values. NAs will be removed for further computations. |
| `digits` | An optional value for digits. Specifies the minimum number of significant digits to be printed in values. The default is `NULL` and will use base R print option. |

## Value

A positive numeric value, which indicates the top market share in percent.

## See Also

Other Market structure measures: concstats_all_mstruct(), concstats_firm(), concstats_mstruct(), concstats_nrs_eq(), concstats_top3(), concstats_top3_df(), concstats_top5(), concstats_top5_df(), concstats_top_df()

## Examples

```
# a vector of market shares
x <- c(0.4, 0.2, 0.25, 0.1, 0.05)
concstats_top(x, digits = 2)
```

---

`concstats_top3` *Top 3 market share*

---

## Description

Top 3 market share

## Usage

```
concstats_top3(x, na.rm = TRUE, digits = NULL)
```

## Arguments

| | |
|---|---|
| `x` | A non-negative numeric vector. |
| `na.rm` | A logical vector that indicates whether `NA` values should be excluded or not. Must be either `TRUE` or `FALSE`. The default is `TRUE`. If set to `FALSE` the computation yields a message if the vector contains `NA` values. NAs will be removed for further computations. |
| `digits` | An optional value for digits. Specifies the minimum number of significant digits to be printed in values. The default is `NULL` and will use base R print option. |

## Value

A positive numeric value, which indicates the cumulative sum of the top 3 market shares as a percentage.

## See Also

Other Market structure measures: concstats_all_mstruct(), concstats_firm(), concstats_mstruct(), concstats_nrs_eq(), concstats_top(), concstats_top3_df(), concstats_top5(), concstats_top5_df(), concstats_top_df()

## Examples

```
# a vector of market shares
x <- c(0.4, 0.2, 0.25, 0.1, 0.05)
concstats_top3(x, digits = 2)
```

`concstats_top3_df` *Top market share data frame*

## Description

Top market share data frame

## Usage

```
concstats_top3_df(x, y, digits = NULL)
```

## Arguments

| | |
|---|---|
| `x` | A data frame or tibble. |
| `y` | A non-negative vector of shares. All integers (e.g. sales) are converted to relative decimal numbers. |
| `digits` | An optional value for digits. Specifies the minimum number of significant digits to be printed in values. The default is `NULL` and will use base R print option. Significant digits defaults to 7. Values are restricted between 1 and default value. |

## Value

A `data frame`.

## Note

Note that the first column in your data frame will be the index and values should be unique.

## See Also

Other Market structure measures: `concstats_all_mstruct()`, `concstats_firm()`, `concstats_mstruct()`, `concstats_nrs_eq()`, `concstats_top()`, `concstats_top3()`, `concstats_top5()`, `concstats_top5_df()`, `concstats_top_df()`

## Examples

```
x <- data.frame(
firm = c("A", "B", "C", "D", "E"),
share = c(0.2,0.25,0.1,0.05,0.4)
)
concstats_top3_df(x, "share", digits = 2)
```

concstats_top5 *Top 5 market share*

## Description

Top 5 market share

## Usage

```
concstats_top5(x, na.rm = TRUE, digits = NULL)
```

## Arguments

| | |
|---|---|
| x | A non-negative numeric vector. |
| na.rm | A logical vector that indicates whether NA values should be excluded or not. Must be either TRUE or FALSE. The default is TRUE. If set to FALSE the computation yields a message if the vector contains NA values. NAs will be removed for further computations. |
| digits | An optional value for digits. Specifies the minimum number of significant digits to be printed in values. The default is NULL and will use base R print option. |

## Value

A positive numeric value, which indicates the cumulative sum of the top 5 market shares as a percentage.

## See Also

Other Market structure measures: concstats_all_mstruct(), concstats_firm(), concstats_mstruct(), concstats_nrs_eq(), concstats_top(), concstats_top3(), concstats_top3_df(), concstats_top5_df(), concstats_top_df()

## Examples

```
# a vector of market shares
x <- c(0.4, 0.2, 0.25, 0.1, 0.05)
concstats_top5(x, digits = 2)
```

`concstats_top5_df` *Top 5 market shares data frame*

## Description

Top 5 market shares data frame

## Usage

```
concstats_top5_df(x, y, digits = NULL)
```

## Arguments

| | |
|---|---|
| `x` | A data frame or tibble. |
| `y` | A non-negative vector of shares. All integers (e.g. sales) are converted to relative decimal numbers. |
| `digits` | An optional value for digits. Specifies the minimum number of significant digits to be printed in values. The default is `NULL` and will use base R print option. Significant digits defaults to 7. Values are restricted between 1 and default value. |

## Value

A `data frame`.

## Note

Note that the first column in your data frame will be the index and values should be unique.

## See Also

Other Market structure measures: `concstats_all_mstruct()`, `concstats_firm()`, `concstats_mstruct()`, `concstats_nrs_eq()`, `concstats_top()`, `concstats_top3()`, `concstats_top3_df()`, `concstats_top5()`, `concstats_top_df()`

## Examples

```
x <- data.frame(
firm = c("A", "B", "C", "D", "E"),
share = c(0.2,0.25,0.1,0.05,0.4)
)
concstats_top5_df(x, "share", digits = 2)
```

concstats_top_df *Top market share data frame*

## Description

Top market share data frame

## Usage

```
concstats_top_df(x, y, digits = NULL)
```

## Arguments

| | |
|---|---|
| x | A data frame or tibble. |
| y | A non-negative vector of shares. All integers (e.g. sales) are converted to relative decimal numbers. |
| digits | An optional value for digits. Specifies the minimum number of significant digits to be printed in values. The default is NULL and will use base R print option. Significant digits defaults to 7. Values are restricted between 1 and default value. |

## Value

A data frame.

## Note

Note that the first column in your data frame will be the index and values should be unique.

## See Also

Other Market structure measures: concstats_all_mstruct(), concstats_firm(), concstats_mstruct(), concstats_nrs_eq(), concstats_top(), concstats_top3(), concstats_top3_df(), concstats_top5(), concstats_top5_df()

## Examples

```
x <- data.frame(
firm = c("A", "B", "C", "D", "E"),
share = c(0.2,0.25,0.1,0.05,0.4)
)
concstats_top_df(x, "share", digits = 2)
```

creditcoops *Creditcoops*

## Description

data set with 22 paired Paraguayan credit cooperatives (2016, 2018)

## Usage

```
data(creditcoops)
```

## Format

A data frame with 44 rows and 5 variables:

`coop_id` double, ID of the credit cooperative

`year` integer, sample year

`total_loans` double, total loans granted (USD) per year and cooperative

`paired` integer, paires of cooperatives

`total_loans_log` double, the natural log of total loans

## Note

real names of the cooperatives have been purposely omitted, but are available on request.

## Author(s)

Andreas Schneider

## Source

https://www.incoop.gov.py

## Examples

```
data("creditcoops")
head(creditcoops)
```

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