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Title Inequality, Welfare and Poverty Indices and Curves using the
EU-SILC Data

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Description R tools to measure and compare inequality, welfare and
poverty using the EU statistics on income and living conditions
surveys.

License GPL-3

Repository https://angelberihuete.r-universe.dev

RemoteUrl https://github.com/angelberihuete/rtip

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Contents

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arpr   *At-risk-of-poverty rate*

Description

Estimates the poverty rate which is defined as the share of people with an equivalised disposable
income below the at-risk-of-poverty threshold.

Usage

```
arpr(dataset, ipuc = "ipuc", hhcsw = "DB090", hhsize = "HX040",
  arpt.value = NULL, ci = NULL, rep = 1000, verbose = FALSE)
```

Arguments

dataset	a data.frame containing the variables.
ipuc	a character string indicating the variable name of the income per unit of consumption. Default is "ipuc".
hhcsw	a character string indicating the variable name of the household cross-sectional weight. Default is "DB090".
hhsize	a character string indicating the variable name of the household size. Default is "HX040".
arpt.value	the at-risk-of-poverty threshold to be used (see arpt). Default is NULL which calculates arpt with default parameters.
ci	a scalar or vector containing the confidence level(s) of the required interval(s). Default does not calculate the confidence interval.
rep	a number to make the confidence interval using boostrap technique.
verbose	logical; if TRUE the confidence interval is plotted.

Details

The equivalised disposable income is calculated using the standard equivalence scale (called the modified OECD scale) recommended by Eurostat. The parametric scale of Buhmann et al. (1988) can also be used. The default is the modified OECD scale (see setupDataset).

Value

The value of the at-risk-of-poverty rate.

Author(s)

A. Berihuete, C.D. Ramos and M.A. Sordo

References

B. Buhmann et al. (1988) Equivalence scales, well-being, inequality and poverty: sensitivity estimates across ten countries using the Luxembourg Income Study (LIS) database, Review of Income and Wealth, 34, 115–142.

http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:At-risk-of-poverty_rate

See Also

arpt, setupDataset

Examples

```
data(eusilc2)
ATdataset <- setupDataset(eusilc2, country = "AT")
arpr(ATdataset,arpt.value = arpt(ATdataset))
```

---

arpt *At-risk-of-poverty threshold*

Description

Estimates the at-risk-of-poverty threshold which is set at 60 percent of the median equivalised disposable income using the standard definition.

Usage

```
arpt(dataset, ipuc = "ipuc", hhcsw = "DB090", hhsize = "HX040",
  pz = 0.6, ci = NULL, rep = 1000, verbose = FALSE)
```

Arguments

`dataset`	a data.frame containing the variables.
`ipuc`	a character string indicating the variable name of the income per unit of consumption. Default is "ipuc".
`hhcsw`	a character string indicating the variable name of the household cross-sectional weight. Default is "DB090".
`hhsize`	a character string indicating the variable name of the household size. Default is "HX040".
`pz`	a number between 0 and 1 which represents the percentage to be used to calculate the at-risk-of-poverty threshold. The default is 0.6.
`ci`	a scalar or vector containing the confidence level(s) of the required interval(s). Default does not calculate the confidence interval.
`rep`	a number to do the confidence interval using boostrap technique.
`verbose`	logical; if TRUE the confidence interval is plotted.

Details

The equivalised disposable income is calculated using the standard equivalence scale (called the modified OECD scale) recommended by Eurostat. The parametric scale of Buhmann et al.(1988) can also be used. The default is the modified OECD scale (see setupDataset).

Value

The value of the at-risk-of-poverty threshold.

Author(s)

A. Berihuete, C.D. Ramos and M.A. Sordo

References

B. Buhmann et al. (1988) Equivalence scales, well-being, inequality and poverty: sensitivity estimates across ten countries using the Luxembourg Income Study (LIS) database, Review of Income and Wealth, 34, 115–142.

http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:At-risk-of-poverty_rate

See Also

setupDataset

Examples

```
data(eusilc2)
ATdataset <- setupDataset(eusilc2, country = "AT")
arpt(ATdataset)
```

---

eusilc2   *Modified synthetic EU-SILC survey data*

Description

The dataset eusilc2 is the same as in the laeken package (see reference below), but transformed in order to do calculations using rtip package functions. Therefore eusilc2 is a synthetic dataset generated from real Austrian EU-SILC containing a data frame.

Usage

```
data(eusilc2)
```

Format

A data frame with 6000 rows and 7 variables:

- DB010, a numeric vector containing the year of the survey.
- DB020, a factor with one level which is the country considered.
- DB040, a factor with as many levels as there are regions in the country.
- DB090, a numeric vector containing information about household cross-sectional weight.
- HX040, an integer vector containing information about households size.
- HX050, a numeric vector containing information about the equivalised household size. The scale employed is the modified OECD scale.
- HX090, a numeric vector containing information about equivalised disposable income (with the modified OECD scale).

Note

The original dataset (eusilc) and the transformations done to obtain eusilc2 dataset are included in data-raw directory (source version package only).

References

A. Andreas et al. (2013) Estimation of Social Exclusion Indicators from Complex Surveys: The R Package laeken, Journal of Statistics Software, 54:1, 1–25

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gini   *Gini index*

Description

Estimates the Gini inequality index of an income distribution.

Usage

```
gini(dataset, ipuc = "ipuc", hhcsw = "DB090", hhsize = "HX040",
  ci = NULL, rep = 1000, verbose = FALSE)
```

Arguments

dataset	a data.frame containing the variables.
ipuc	a character string indicating the variable name of the income per unit of consumption. Default is "ipuc".
hhcsw	a character string indicating the variable name of the household cross-sectional weight. Default is "DB090".
hhsize	a character string indicating the variable name of the household size. Default is "HX040".
ci	a scalar or vector containing the confidence level(s) of the required interval(s). Default does not calculate the confidence interval.
rep	a number to do the confidence interval using boostrap technique.
verbose	logical; if TRUE the confidence interval is plotted.

Details

The Gini index is calculated using the equivalised disposable income of each individual. Two types of equivalence scales can be used, the modified OECD scale and the parametric scale of Buhmann et al. (1988). The default is the modified OECD scale (see setupDataset).

Value

The value of the Gini index.

Author(s)

A. Berihuete, C.D. Ramos and M.A. Sordo

References

B. Buhmann et al. (1988) Equivalence scales, well-being, inequality and poverty: sensitivity estimates across ten countries using the Luxembourg Income Study (LIS) database, Review of Income and Wealth, 34, 115–142.

E. Ferreira and A. Garín (1997) Una nota sobre el cálculo del índice de Gini, Estadística Española, 39(142), 207–218.

http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Gini_coefficient

See Also

setupDataset

Examples

```
data(eusilc2)
ATdataset <- setupDataset(eusilc2, country = "AT")
gini(ATdataset)
```

---

lc   *Lorenz and Generalized Lorenz curves*

Description

Estimates the Lorenz and the Generalized Lorenz curves ordinates.

Usage

```
lc(dataset, ipuc = "ipuc", hhcsw = "DB090", hhsize = "HX040",
  samplesize = 10, generalized = FALSE, plot = FALSE)
```

Arguments

dataset	a data.frame containing the variables.
ipuc	a character string indicating the variable name of the income per unit of consumption. Default is "ipuc".
hhcsw	a character string indicating the variable name of the household cross-sectional weight. Default is "DB090".
hhsize	a character string indicating the variable name of the household size. Default is "HX040".
samplesize	an integer which specifies the number of (equally spaced) percentiles to be used in the estimation of the Lorenz (or the Generalized Lorenz) ordinates. The default value is 10. If samplesize is set to "complete", ordinates are computed in each value along the whole distribution.
generalized	logical; if TRUE the Generalized Lorenz curve ordinates will be estimated.
plot	logical; if TRUE plots the Lorenz or Generalized Lorenz curve.

Details

Lorenz and Generalized Lorenz curves ordinates are computed using the equivalised disposable income. The equivalence scales employed are the modified OECD scale and the parametric scale of Buhmann et al. (1988) (see setupDataset).

Value

A data.frame with the following components:

- x.lg, vector of cumulated proportion of population.
- y.lg, vector with values of the Lorenz or the Generalized Lorenz curves ordinates.

Author(s)

A. Berihuete, C.D. Ramos and M.A. Sordo

References

B C Arnold (1987) Majorization and the Lorenz order: A brief introduction, Lecture Notes in Statistics, 43, Springer-Verlag.

B. Buhmann et al. (1988) Equivalence scales, well-being, inequality and poverty: sensitivity estimates across ten countries using the Luxembourg Income Study (LIS) database, Review of Income and Wealth, 34, 115–142.

See Also

setupDataset

Examples

```
data(eusilc2)
ATdataset <- setupDataset(eusilc2, country = "AT")
lc.curve <- lc(ATdataset)
str(lc.curve)
```

LCS2014   *Spanish living conditions survey data for the year 2014*

Description

This is the Spanish National Statistics Institute (INE in Spanish) release for the living conditions survey in 2014. The dataset is not modified but transformed properly in order to use functions in the package. You can obtain the raw datasets at INE.

These datasets and the function to extract the variables are available in data-raw directory (source version package only).

Usage

```
data(LCS2014)
```

Format

A data frame with 11965 rows of 7 variables:

- DB010, a numeric vector containing the year of the survey.
- DB020, a factor with one level which is the country considered.
- DB040, a factor with as many levels as there are regions in the country.
- DB090, a numeric vector containing information about household cross-sectional weight.
- HX040, an integer vector containing information about households size.
- HX050, a numeric vector containing information about the equivalised household size. The scale employed is the modified OECD scale.
- HX090, a numeric vector containing information about equivalised disposable income (with the modified OECD scale).

Note

According to the INE regulation, it is mandatory to inform users that the values in this dataset were not modified.

---

loadEUSILC   *Load the living conditions survey (EUSILC)*

Description

`loadEUSILC()` extracts some variables from the EUSILC survey files and transforms them into a suitable data frame in order to do the calculations.

Usage

```
loadEUSILC(eusilc_d_file, eusilc_h_file)
```

Arguments

eusilc_d_file   a string with the filename of D-file.

eusilc_h_file   a string with the filename of H-file.

Details

Vector strings `varD` and `varH` contain the names of the variables needed to do the calculations with rtip package. These variables are given by Eurostat in two different files, namely basic household register (H-file) and household data (D-file).

Value

A data frame containing the variables required to use the functions in the package.

Note

We do not give examples in this function because the EUSILC survey datasets have a restricted licence for use.

Author(s)

A. Berihuete, C.D. Ramos and M.A. Sordo

---

loadLCS   *Load the living conditions survey (INE)*

Description

loadLCS() loads the living conditions survey from Spanish National Statistics Institute (INE in Spanish).

Usage

```
loadLCS(lcs_d_file, lcs_h_file)
```

Arguments

lcs_d_file	a string with the filename of D-file.
lcs_h_file	a string with the filename of H-file.

Details

Regularly the INE releases the living conditions survey through two different files which can be downloaded for free. The filename of these files contains the letters D and H, and these files include dozens of variables. Only some of these variables are needed to do the calculations with rtip package.

Value

A data frame containing the variables required.

Note

We have included two files in dat-raw to test the function (source version package only).

Author(s)

A. Berihuete, C.D. Ramos and M.A. Sordo

Examples

```
## Not run: lcs2014 <- loadLCS("esudb14d.csv","esudb14h.csv")
```

---

mih   *Mean income per household*

Description

Estimates the mean income per household.

Usage

```
mih(dataset, hhcsw = "DB090", ehhs = "HX050", edi = "HX090", ci = NULL,
  rep = 1000, verbose = FALSE)
```

Arguments

dataset	a data.frame containing the variables.
hhcsw	a character string indicating the variable name of the household cross-sectional weight. Default is "DB090".
ehhs	a character string indicating the variable name of the equivalised household size. Default is "HX050".
edi	a character string indicating the variable name of the equivalised disposable income (with the modified OECD scale). Default is "HX090".
ci	a scalar or vector containing the confidence level(s) of the required interval(s). Default does not calculate the confidence interval.
rep	a number to make the confidence interval using boostrap technique.
verbose	logical; if TRUE the confidence interval is plotted.

Value

The value of mean income per household.

Author(s)

A. Berihuete, C.D. Ramos and M.A. Sordo

References

B. Buhmann et al. (1988) Equivalence scales, well-being, inequality and poverty: sensitivity estimates across ten countries using the Luxembourg Income Study (LIS) database, Review of Income and Wealth, 34, 115–142.

http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Equivalised_disposable_income

See Also

setupDataset.

Examples

```
data(eusilc2)
ATdataset <- setupDataset(eusilc2, country = "AT")
mih(ATdataset)
```

---

mip   *Mean income per person*

Description

Estimates the mean income per person.

Usage

```
mip(dataset, ipuc = "ipuc", hhcsw = "DB090", hhsize = "HX040",
  ehhs = "HX050", edi = "HX090", ci = NULL, rep = 1000,
  verbose = FALSE)
```

Arguments

dataset	a data.frame containing the variables.
ipuc	a character string indicating the variable name of the income per unit of consumption. Default is "ipuc".
hhcsw	a character string indicating the variable name of the household cross-sectional weight. Default is "DB090".
hhsize	a character string indicating the variable name of the household size. Default is "HX040".
ehhs	a character string indicating the variable name of the equivalised household size. Default is "HX050".
edi	a character string indicating the variable name of the equivalised disposable income (with the modified OECD scale). Default is "HX090".
ci	a scalar or vector containing the confidence level(s) of the required interval(s). Default does not calculate the confidence interval.
rep	a number to make the confidence interval using boostrap technique.
verbose	logical; if TRUE the confidence interval is plotted.

Value

The value of mean income per person.

Author(s)

A. Berihuete, C.D. Ramos and M.A. Sordo

References

B. Buhmann et al. (1988) Equivalence scales, well-being, inequality and poverty: sensitivity esti-mates across ten countries using the Luxembourg Income Study (LIS) database, Review of Income and Wealth, 34, 115–142.

http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Equivalised_disposable_income

See Also

setupDataset.

Examples

```
data(eusilc2)
ATdataset <- setupDataset(eusilc2, country = "AT")
mip(ATdataset)
```

---

miuc	*Mean income per unit of consumption*

Description

Estimates the mean income per unit of consumption which is the mean of the equivalised disposable income.

Usage

```
miuc(dataset, ipuc = "ipuc", hhcsw = "DB090", hhsize = "HX040",
  ci = NULL, rep = 1000, verbose = FALSE)
```

Arguments

dataset	a data.frame containing the variables.
ipuc	a character string indicating the variable name of the income per unit of consumption. Default is "ipuc".
hhcsw	a character string indicating the variable name of the household cross-sectional weight. Default is "DB090".
hhsize	a character string indicating the variable name of the household size. Default is "HX040".
ci	a scalar or vector containing the confidence level(s) of the required interval(s). Default does not calculate the confidence interval.
rep	a number to make the confidence interval using boostrap technique.
verbose	logical; if TRUE the confidence interval is plotted.

Details

The equivalised disposable income is calculated using the standard equivalence scale (called the modified OECD scale) recommended by Eurostat. The parametric scale of Buhmann et al. (1988) can also be used. The default is the modified OECD scale (see setupDataset).

Value

The value of mean income per unit of consumption

Author(s)

A. Berihuete, C.D. Ramos and M.A. Sordo

References

B. Buhmann et al. (1988) Equivalence scales, well-being, inequality and poverty: sensitivity estimates across ten countries using the Luxembourg Income Study (LIS) database, Review of Income and Wealth, 34, 115–142.

http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Equivalised_disposable_income

See Also

setupDataset.

Examples

```
data(eusilc2)
ATdataset <- setupDataset(eusilc2, country = "AT")
miuc(ATdataset)
```

OmegaGL   *Matrix for testing Generalized Lorenz dominance*

Description

The auxiliary function OmegaGL computes the (empirical) vector of Generalized Lorenz (GL) curve ordinates and its corresponding covariance matrix. Given two income distributions, this matrix will be used to test the null hypothesis that one distribution dominates the other in the Generalized Lorenz sense.

Usage

```
OmegaGL(dataset, ipuc = "ipuc", hhcsw = "DB090", hhsize = "HX040",
  samplesize = 10, generalized = TRUE)
```

Arguments

`dataset`	a data.frame containing the variables.
`ipuc`	a character string indicating the variable name of the income per unit of consumption. Default is "ipuc".
`hhcsw`	a character string indicating the variable name of the household cross-sectional weight. Default is "DB090".
`hhsize`	a character string indicating the variable name of the household size. Default is "HX040".
`samplesize`	An integer representing the number of GL ordinates to be estimated. Default is 10. These ordinates are estimated at points p_i, where $p_i = i/samplesize, \quad i = 1, \ldots, samplesize.$
`generalized`	logical; if FALSE the matrix for testing Lorenz dominance will be calculated.

Details

Estimation of GL curve ordinates and their covariance matrix are calculated following Beach and Davidson (1983) and Beach and Kaliski (1986).

Calculations are made using the equivalised disposable income. The equivalence scales that can be employed are the modified OECD scale or the parametric scale of Buhmann et al. (1988). The default is the modified OECD scale (see setupDataset).

Value

A list with the following components:

- Omega, covariance matrix for the estimated vector of GL curve ordinates.
- gl.curve, estimated vector of GL curve ordinates.
- p, vector with components $p_i = i/samplesize, \quad i = 1, ..., samplesize.$
- quantiles, estimated vector of quantiles of income corresponding to these p_i.
- gamma, vector of estimated conditional means of income less than the quantile corresponding to $p_i = i/samplesize, \quad i = 1, \ldots, samplesize.$

Author(s)

A. Berihuete, C.D. Ramos and M.A. Sordo

References

C. M. Beach and R. Davidson (1983) Distribution-free statistical inference with Lorenz curves and income shares, Review of Economic Studies, 50, 723–735.

C. M. Beach and S. F. Kaliski (1986) Curve inference with sample weights: and application to the distribution of unemployment experience, Journal of the Royal Statistical Society. Series C (Applied Statistics), Vol. 35, No. 1, 38–45.

B. Buhmann et al. (1988) Equivalence scales, well-being, inequality and poverty: sensitivity estimates across ten countries using the Luxembourg Income Study (LIS) database, Review of Income and Wealth, 34, 115–142.

K. Xu (1997) Asymptotically distribution-free statistical test for generalized Lorenz curves: An alternative approach, Journal of Income Distribution, 7, 45–62.

See Also

testGL, setupDataset

OmegaTIP   *Matrix for testing TIP dominance*

Description

The auxiliary function OmegaTIP computes the (empirical) vector of TIP curve ordinates and its corresponding covariance matrix. Given two income distributions, this matrix will be used to test the null hypothesis that one distribution dominates the other in the TIP sense.

Usage

```
OmegaTIP(dataset, ipuc = "ipuc", hhcsw = "DB090", hhsize = "HX040",
  arpt.value = NULL, samplesize = 50, norm = FALSE)
```

Arguments

dataset	a data.frame containing the variables.
ipuc	a character string indicating the variable name of the income per unit of consumption. Default is "ipuc".
hhcsw	a character string indicating the variable name of the household cross-sectional weight. Default is "DB090".
hhsize	a character string indicating the variable name of the household size. Default is "HX040".
arpt.value	the at-risk-of-poverty threshold to be used (see arpt). Default is NULL which calculates arpt with default parameters.
samplesize	an integer which represents the number of TIP curve ordinates to be estimated. These ordinates will be estimated at points p_i, where $p_i = i/samplesize, i = 1, \ldots, samplesize$. Default is 50.
norm	logical; if TRUE, the normalised TIP curve ordinates are computed using the normalised poverty gaps (poverty gaps divided by the poverty threshold).

Details

Estimation of TIP curve ordinates and their covariance matrix are made following Beach and Davidson (1983), Beach and Kaliski (1986) and Xu and Osberg (1998).

Calculations are made using the equivalised disposable income. The equivalence scales that can be employed are the modified OECD scale or the parametric scale of Buhmann et al. (1988). The default is the modified OECD scale (see setupDataset).

Value

A list with the following components:

- Omega, covariance matrix for the estimated vector of TIP curve ordinates.

- tip.curve estimated vector of TIP curve ordinates.

Author(s)

A. Berihuete, C.D. Ramos and M.A. Sordo

References

C. M. Beach and R. Davidson (1983) Distribution-free statistical inference with Lorenz curves and income shares, Review of Economic Studies, 50, 723–735.

C. M. Beach and S. F. Kaliski (1986) Curve inference with sample weights: and application to the distribution of unemployment experience, Journal of the Royal Statistical Society. Series C (Applied Statistics), Vol. 35, No. 1, 38–45.

B. Buhmann et al. (1988) Equivalence scales, well-being, inequality and poverty: sensitivity estimates across ten countries using the Luxembourg Income Study (LIS) database, Review of Income and Wealth, 34, 115–142.

K. Xu and L. Osberg (1998) A distribution-free test for deprivation dominance, Econometric Reviews,17, 415–429.

See Also

testTIP, setupDataset, arpt

---

qsr   *Income quintile share ratio*

Description

Estimates the quintile share ratio of an income distribution. It is defined as the ratio of total income received by the 20 percent of the population with the highest income to that received by the 20 percent of the population with the lowest income.

Usage

```
qsr(dataset, ipuc = "ipuc", hhcsw = "DB090", hhsize = "HX040",
  ci = NULL, rep = 1000, verbose = FALSE)
```

Arguments

`dataset`	a data.frame containing the variables.
`ipuc`	a character string indicating the variable name of the income per unit of consumption. Default is "ipuc".
`hhcsw`	a character string indicating the variable name of the household cross-sectional weight. Default is "DB090".
`hhsize`	a character string indicating the variable name of the household size. Default is "HX040".
`ci`	a scalar or vector containing the confidence level(s) of the required interval(s). Default does not calculate the confidence interval.
`rep`	a number to do the confidence interval using boostrap technique.
`verbose`	logical; if TRUE the confidence interval is plotted.

Details

It is calculated using the equivalised disposable income. Two types of equivalence scales can be used, the modified OECD scale and the parametric scale of Buhmann et al. (1988). The default is the modified OECD scale (see setupDataset).

Value

The value of the income quintile share ratio.

Author(s)

A. Berihuete, C.D. Ramos and M.A. Sordo

References

B. Buhmann et al. (1988) Equivalence scales, well-being, inequality and poverty: sensitivity estimates across ten countries using the Luxembourg Income Study (LIS) database, Review of Income and Wealth, 34, 115–142.

http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Income_quintile_share_ratio

See Also

setupDataset

Examples

```
data(eusilc2)
ATdataset <- setupDataset(eusilc2, country = "AT")
qsr(ATdataset)
```

---

rmpg *Relative median at-risk-of-poverty gap*

Description

Estimates the relative median at-risk-of-poverty gap which is the difference between the at-risk-of-poverty threshold and the median equivalised disposable income of people below the at-risk-of-poverty threshold, expressed as a percentage of this threshold.

Usage

```
rmpg(dataset, ipuc = "ipuc", hhcsw = "DB090", hhsize = "HX040",
  arpt.value = NULL, ci = NULL, rep = 1000, verbose = FALSE)
```

Arguments

dataset   a data.frame containing the variables.

ipuc   a character string indicating the variable name of the income per unit of consumption. Default is "ipuc".

hhcsw   a character string indicating the variable name of the household cross-sectional weight. Default is "DB090".

hhsize   a character string indicating the variable name of the household size. Default is "HX040".

arpt.value   the at-risk-of-poverty threshold to be used (see arpt). Default is NULL which calculates arpt with default parameters.

ci   a scalar or vector containing the confidence level(s) of the required interval(s). Default does not calculate the confidence interval.

rep   a number to do the confidence interval using boostrap technique.

verbose   logical; if TRUE the confidence interval is plotted.

Details

The equivalised disposable income is calculated using the standard equivalence scale (called the modified OECD scale) recommended by Eurostat. The parametric scale of Buhmann et al. (1988) can also be used. The default is the modified OECD scale (see setupDataset).

Value

The value of the relative median at-risk-of-poverty gap.

Author(s)

A. Berihuete, C.D. Ramos and M.A. Sordo

References

B. Buhmann et al. (1988) Equivalence scales, well-being, inequality and poverty: sensitivity estimates across ten countries using the Luxembourg Income Study (LIS) database, Review of Income and Wealth, 34, 115–142.

http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Relative_median_at-risk-of-poverty_gap

See Also

arpt, setupDataset

Examples

```
data(eusilc2)
ATdataset <- setupDataset(eusilc2, country = "AT")
rmpg(ATdataset,arpt.value = arpt(ATdataset))
```

---

s1   *Maximum of TIP curve*

Description

Estimates the highest point of the TIP curve which is a measure of the intensity of poverty. It is equal to the mean poverty gap (difference between the poverty threshold and the equivalised disposable income).

Usage

```
s1(dataset, ipuc = "ipuc", hhcsw = "DB090", hhsize = "HX040",
  arpt.value = NULL, norm = FALSE, ci = NULL, rep = 1000,
  verbose = FALSE)
```

Arguments

dataset	a data.frame containing the variables.
ipuc	a character string indicating the variable name of the income per unit of consumption. Default is "ipuc".
hhcsw	a character string indicating the variable name of the household cross-sectional weight. Default is "DB090".
hhsize	a character string indicating the variable name of the household size. Default is "HX040".
arpt.value	the at-risk-of-poverty threshold to be used (see arpt). Default is NULL which calculates arpt with default parameters.

norm	logical; if TRUE, the normalised mean poverty gap index is calculated which adds up the extent to which individuals on average fall below the poverty threshold, and expresses it as a percentage of the poverty threshold.
ci	a scalar or vector containing the confidence level(s) of the required interval(s). Default does not calculate the confidence interval.
rep	a number to do the confidence interval using boostrap technique.
verbose	logical; if TRUE the confidence interval is plotted.

Details

It is computed using the equivalised disposable income. The equivalence scales that can be employed are the modified OECD scale or the parametric scale of Buhmann et al. (1988). The default is the modified OECD scale (see setupDataset).

The normalised mean poverty gap index, also named FGT(1), is a particular case of the family of poverty indexes proposed by Foster, Greer and Thorbecke (1984).

Value

The value of the poverty measure.

Author(s)

A. Berihuete, C.D. Ramos and M.A. Sordo

References

B. Buhmann et al. (1988) Equivalence scales, well-being, inequality and poverty: sensitivity estimates across ten countries using the Luxembourg Income Study (LIS) database, Review of Income and Wealth, 34, 115–142.

J.E. Foster, J. Greer and E. Thorbecke (1984) Notes and comments. A class of descomposable poverty measures, Econometrica, 52, 761–766.

M.A. Sordo and C.D. Ramos (2011) Poverty comparisons when TIP curves intersect, SORT, 31, 65–80.

See Also

tip, setupDataset, arpt

Examples

```
data(eusilc2)
ATdataset <- setupDataset(eusilc2, country = "AT")
s1(ATdataset,arpt.value = arpt(ATdataset), norm = TRUE)
```

---

s2   *Twice the area under the TIP curve*

Description

Estimates the poverty measure which is twice the area under the TIP curve.

Usage

```
s2(dataset, ipuc = "ipuc", hhcsw = "DB090", hhsize = "HX040",
  arpt.value = NULL, norm = FALSE, ci = NULL, rep = 1000,
  verbose = FALSE)
```

Arguments

dataset	a data.frame containing the variables.
ipuc	a character string indicating the variable name of the income per unit of consumption. Default is "ipuc".
hhcsw	a character string indicating the variable name of the household cross-sectional weight. Default is "DB090".
hhsize	a character string indicating the variable name of the household size. Default is "HX040".
arpt.value	the at-risk-of-poverty threshold to be used (see arpt). Default is NULL which calculates arpt with default parameters.
norm	logical; if TRUE, the area under the normalised TIP curve is then estimated (see tip).
ci	a scalar or vector containing the confidence level(s) of the required interval(s). Default does not calculate the confidence interval.
rep	a number to do the confidence interval using boostrap technique.
verbose	logical; if TRUE the confidence interval is plotted.

Details

It is computed using the equivalised disposable income. The equivalence scales that can be employed are the modified OECD scale or the parametric scale of Buhmann et al. (1988). The default is the modified OECD scale (see setupDataset).

This poverty index coincides with the Sen-Shorrocks-Thon index and the S(2,z) index of Sordo and Ramos (2011).

Value

The value of the poverty measure.

Author(s)

A. Berihuete, C.D. Ramos and M.A. Sordo

References

B. Buhmann et al. (1988) Equivalence scales, well-being, inequality and poverty: sensitivity esti-
mates across ten countries using the Luxembourg Income Study (LIS) database, Review of Income
and Wealth, 34, 115–142.

A.F. Shorrocks (1995) Revisiting the Sen poverty index, Econometrica, 63, 1225–1230.

D. Thon (1979) On measuring poverty, Review of Income and Wealth, 25, 429–439.

D. Thon (1983) A poverty measure, The Indian Economic Journal, 30, 55–70.

M.A. Sordo and C.D. Ramos (2011) Poverty comparisons when TIP curves intersect, SORT, 31,
65–80.

See Also

tip, setupDataset, arpt

Examples

```
data(eusilc2)
ATdataset <- setupDataset(eusilc2, country = "AT")
s2(ATdataset,arpt.value = arpt(ATdataset), norm = TRUE)
```

---

setupDataset   *Setup datasets loaded from the living conditions survey*

Description

Extracts and transforms variables taken directly from the EU-SILC survey.

Usage

```
setupDataset(dataset, country = "ES", region = NULL, s = NULL,
  deflator = NULL, pppr = NULL)
```

Arguments

dataset	a data.frame containing variables in the EU-SILC microdata format.
country	a character string specifying the country whose data will be considered.
region	a character/vector string specifying the region(s) of the country whose data will be considered. The default (NULL) considers all regions in the country.
s	a numeric value between 0 and 1 specifying the equivalence scale to be used to obtain the equivalised disposable income. The default (NULL) considers the standard modified OECD scale.
deflator	numeric; a number to be used as a deflator. The default (NULL) will not apply any deflation.
pppr	the purchasing power parity rate (PPPR) will be used. Default is NULL.

Details

We obtain the equivalised disposable income with the equivalence scale of Buhmann et al. (1988) by assigning a numeric value between 0 and 1 to argument s. The parameter s is called elasticity of equivalence.

The purchasing power parity exchange rate is useful for making comparisons between countries.

Value

A data.frame with the following variables:

- DB010 a numeric vector containing the year of the survey.
- DB020 a factor with one level which is the country considered.
- DB040 a factor with as many levels as there are regions in the country.
- DB090 a numeric vector containing information about household cross-sectional weight.
- HX040 an integer vector containing information about households size.
- HX050 a numeric vector containing information about the equivalised household size. The scale employed is the modified OECD scale.
- HX090 a numeric vector containing information about equivalised disposable income (with the modified OECD scale).
- ipuc a numeric vector containing the income per unit of consumption. This variable takes into account the value assigned to s and pppr (if they are not NULL).

Author(s)

A. Berihuete, C.D. Ramos and M.A. Sordo

References

B. Buhmann et al. (1988) Equivalence scales, well-being, inequality and poverty: sensitivity estimates across ten countries using the Luxembourg Income Study (LIS) database, Review of Income and Wealth, 34, 115–142.

See Also

loadEUSILC, loadLCS

Examples

```
data(eusilc2)
ATdataset <- setupDataset(eusilc2, country = "AT")
str(ATdataset)
```

---

testGL   *Test for Lorenz and Generalized Lorenz dominance*

Description

Statistical test procedure given by Xu (1997) to study Generalized Lorenz dominance from sample Generalized Lorenz curve estimates. Lorenz dominance from sample Lorenz curve estimates can also be studied (Beach and Kaliski, 1986).

Usage

```
testGL(dataset1, dataset2, ipuc = "ipuc", hhcsw = "DB090",
  hhsize = "HX040", generalized = TRUE, samplesize = 10, alpha = 0.05)
```

Arguments

dataset1	a data.frame containing the variables.
dataset2	a data.frame containing the variables.
ipuc	a character string indicating the variable name of the income per unit of consumption. Default is "ipuc".
hhcsw	a character string indicating the variable name of the household cross-sectional weight. Default is "DB090".
hhsize	a character string indicating the variable name of the household size. Default is "HX040".
generalized	logical; if FALSE the test will be applied to compare two Lorenz curves. Otherwise Generalized Lorenz curves will be compared.
samplesize	an integer which represents the number of Lorenz (Generalized Lorenz) curve ordinates to be estimated for comparison. The default is 10.
alpha	a scalar indicating the significance level. Default is 0.05.

Details

The null hypothesis to be tested is that the Lorenz (Generalized Lorenz) curve calculated from dataset1 dominates the one calculated from dataset2.

Value

A list with the following components:

- Tvalue the value of the test-statistic
- p.value simulated p-value of the test-statistic Tvalue (Wolak, 1989). It is calculated only when the Tvalue falls into an inconclusive region.

• decision if the Tvalue is less than the lower-bound of the critical value at the $alpha$ significance level the decision is "Do not reject null hypothesis". If the Tvalue is greater than the upper-bound of the critical value at the $alpha$ significance level the decision is "Reject null hypothesis". Lower and upper-bounds critical values are obtained from Kodde and Palm (1986). If Tvalue falls into an inconclusive region (between the lower- and upper-bounds) the p-value will be estimated following Wolak (1989).

Author(s)

A. Berihuete, C.D. Ramos and M.A. Sordo

References

C. M. Beach and R. Davidson (1983) Distribution-free statistical inference with Lorenz curves

C. M. Beach and S. F. Kaliski (1986) Curve inference with sample weights: and application to the distribution of unemployment experience, Journal of the Royal Statistical Society. Series C (Applied Statistics), Vol. 35, No. 1, 38–45.

D.A. Kodde and F.C. Palm (1986) Wald criteria for jointly testing equality and inequality restrictions, Econometrica, 50, 1243–1248.

F.A. Wolak (1989), Testing inequality constrains in linear econometric models, Journal of Econometrics, 41, 205–235.

K. Xu (1997) Asymptotically distribution-free statistical test for generalized Lorenz curves: An alternative approach, Journal of Income Distribution, 7(1), 45–62.

See Also

OmegaGL, setupDataset

Examples

```
data(eusilc2)
ATdataset1 <- setupDataset(eusilc2, country = "AT", region = "Burgenland")
ATdataset2 <- setupDataset(eusilc2, country = "AT", region = "Carinthia")
testGL(ATdataset1, ATdataset2, generalized = TRUE, samplesize = 10, alpha = 0.05)
```

---

testTIP   *Test for TIP dominance*

Description

Statistical test procedure given by Xu and Osberg (1998) to study TIP dominance from sample TIP curve estimates.

Usage

```
testTIP(dataset1, dataset2, ipuc = "ipuc", hhcsw = "DB090",
  hhsize = "HX040", pz = 0.6, same.arpt.value = NULL, norm = FALSE,
  samplesize = 50, alpha = 0.05)
```

Arguments

dataset1	a data.frame containing the variables.
dataset2	a data.frame containing the variables.
ipuc	a character string indicating the variable name of the income per unit of consumption. Default is "ipuc".
hhcsw	a character string indicating the variable name of the household cross-sectional weight. Default is "DB090".
hhsize	a character string indicating the variable name of the household size. Default is "HX040".
pz	a number between 0 and 1 which represents the percentage to be used to calculate the at-risk-of-poverty threshold. The default is 0.6.
same.arpt.value	
	a number that will be used as a common poverty threshold. If NULL, poverty thresholds will be calculated from each datasets (see arpt).
norm	logical; if TRUE, the normalised TIP curve ordinates are computed using the normalised poverty gaps (poverty gaps divided by the poverty threshold).
samplesize	an integer which represents the number of TIP curve ordinates to be estimated. The default is 50.
alpha	a scalar indicating the significance level. Default is 0.05.

Details

Because the TIP curve becomes horizontal at the arpr value, it is only necessary to have the test implemented over the interval $(0, \max\{arpr1, arpr2\})$. For that reason both TIP curves are truncated at the same value equal to $\max\{arpr1, arpr2\}$ and ordinates are only compared at points $p_i = i/samplesize$, where $i = 1, \ldots, k$ in the interval $(0, \max\{arpr1, arpr2\})$ (see arpr function).

The null hypothesis to be tested is that the TIP curve calculated from dataset1 dominates the one calculated from dataset2.

Value

A list with the following components:

- Tvalue, the value of the test-statistic.
- p.value, simulated p-value of the test-statistic Tvalue (Wolak, 1989). It is calculated only when the Tvalue falls into an inconclusive region.

- decision, if the Tvalue is less than the lower-bound of the critical value at the $alpha$ significance level the decision is "Do not reject null hypothesis". If the Tvalue is greater than the upper-bound of the critical value at the $alpha$ significance level the decision is "Reject null hypothesis". Lower and upper-bounds critical values are obtained from Kodde and Palm (1986). If Tvalue falls into an inconclusive region (between the lower- and upper-bounds) the p-value will be estimated following Wolak (1989).

Author(s)

A. Berihuete, C.D. Ramos and M.A. Sordo

References

C. M. Beach and S. F. Kaliski (1986) Curve inference with sample weights: and application to the distribution of unemployment experience, Journal of the Royal Statistical Society. Series C (Applied Statistics), Vol. 35, No. 1, 38–45.

D.A. Kodde and F.C. Palm (1986) Wald criteria for jointly testing equality and inequality restrictions, Econometrica, 50, 1243–1248.

F.A. Wolak (1989), Testing inequality constrains in linear econometric models, Journal of Econometrics, 41, 205–235.

K. Xu and L. Osberg (1998) A distribution-free test for deprivation dominance, Econometric Reviews, 17, 415–429.

See Also

OmegaTIP, setupDataset, arpt, arpr

Examples

```
data(eusilc2)
ATdataset <- setupDataset(eusilc2, country = "AT")
ATdataset1 <- setupDataset(eusilc2, country = "AT", region = "Burgenland")
ATdataset2 <- setupDataset(eusilc2, country = "AT", region = "Carinthia")
testTIP(ATdataset1, ATdataset2, same.arpt.value = arpt(ATdataset), samplesize = 50, alpha = 0.05)
```

---

tip	*TIP curve*

Description

Estimates TIP curve ordinates. The TIP curve is defined by plotting the cumulated proportion of population on the x-axis and the cumulated per capita poverty gap (the distance between each income and the poverty threshold) on the y-axis from the biggest one downwards.

Usage

```
tip(dataset, ipuc = "ipuc", hhcsw = "DB090", hhsize = "HX040",
  arpt.value = NULL, samplesize = 50, norm = FALSE, plot = FALSE)
```

Arguments

dataset	a data.frame containing the variables.
ipuc	a character string indicating the variable name of the income per unit of consumption. Default is "ipuc".
hhcsw	a character string indicating the variable name of the household cross-sectional weight. Default is "DB090".
hhsize	a character string indicating the variable name of the household size. Default is "HX040".
arpt.value	the at-risk-of-poverty threshold to be used (see arpt). Default is NULL which calculates arpt with default parameters.
samplesize	an integer which specifies the number of (equally spaced) percentiles to be used in the estimation of the TIP ordinates The default is 50. If samplesize is set to "complete", ordinates are computed in each value along the whole distribution.
norm	logical; if TRUE, the normalised TIP curve ordinates are computed using the normalised poverty gaps (poverty gaps divided by the poverty threshold).
plot	logical; if TRUE plots the TIP curve.

Details

The TIP (Three I's of Poverty) curve ordinates are computed using the equivalised disposable income. The equivalence scales that can be employed are the modified OECD scale or the parametric scale of Buhmann et al. (1988). The default is the modified OECD scale (see setupDataset).

Value

A data.frame with the following components:

x.tip vector of cumulated proportion of population.

y.tip vector with values of tip curve ordinates.

Author(s)

A. Berihuete, C.D. Ramos and M.A. Sordo

References

B. Buhmann et al. (1988) Equivalence scales, well-being, inequality and poverty: sensitivity estimates across ten countries using the Luxembourg Income Study (LIS) database, Review of Income and Wealth, 34, 115–142.

S.P. Jenkins and P.J. Lambert (1997) Three I's of poverty curves, with an analysis of UK poverty trends, Oxford Economic Papers, 49, 317–327.

See Also

setupDataset, arpt

Examples

```
data(eusilc2)
ATdataset <- setupDataset(eusilc2, country = "AT")
tip.curve <- tip(ATdataset, arpt.value = arpt(ATdataset), norm = TRUE)
str(tip.curve)
```

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