Package 'multilateral'

October 13, 2022

Type Package

Title Generalised Function to Calculate a Variety of Multilateral Price Index Methods

Version 1.0.0

Description A flexible, efficient implementation of multilateral price index calculations. Includes common methods focused on time product dummy regression and GEKS variations. Allows for extension of the methods through automatic window splicing. See Krsinich (2016) <doi:10.1515/jos-2016-0021>.

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Encoding UTF-8

LazyData true

RoxygenNote 7.1.1

URL https://github.com/MjStansfi/multilateral

Suggests testthat, knitr, rmarkdown, devtools, dplyr, ggplot2

VignetteBuilder knitr

Imports assertive, data.table, fastmatch, parallel, yaml, MatrixModels

NeedsCompilation no

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R topics documented:

gm_mean *Geometric mean*

Description

Calculate the geometric mean of a vector of numbers

Usage

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

Arguments

x	an R numerical object
na.rm	a logical value indicating whether NA values should be stripped before the computation proceeds.

Value

If all values in x are numeric class, a single numeric class value is returned.

Examples

```
x <- c(0:10, 50)
gm_mean(x)
```

multilateral *Multilateral price index calculation*

Description

A flexible implementation of multilateral price index calculation for scanner data. This function can be applied on any dataset where key attributes exist (depending on method). Those are in general terms a period, ID, price, and quantity. It will allow for extension of the method by the use of calculation over a window of time and splicing them together.

Usage

```
multilateral(
  period,
  price,
  index_method,
  check_inputs_ind = TRUE,
  verbose = FALSE,
  ...
```

```
)

## S3 method for class 'multilateral'
print(x, ...)
```

Arguments

period	vector of the periods corresponding to price observations. NOTE: period must be of class Date or numeric.
price	vector of prices
index_method	The index method of choice
check_inputs_ind	logical, whether to check inputs or not
verbose	print additional information to console
...	All other possible arguments, see details
x	multilateral class object

Details

The function takes vectors for each of the inputs. It is important to note that the period argument must be of numeric or Date class. This is because the order of the dates matters.

The function also has the capability to run in parallel, using the num_cores argument. Note that for smaller datasets using non-parallel code is often faster than using parallelisation due to the overhead associated with dividing the job across multiple cores.

... represents all other possible arguments the user can provide, they include: id, quantity, weight, features, splice_method, window_length, matched, chain_method, num_cores

index_method can be one of 'TPD', 'TDH', 'GEKS-J','GEKS-F','GEKS-T', or 'GEKS-IT' you can view the configuration file found under inst/config/index_method_config for more information

splice_method can be one of 'half','window','movement','geomean', or 'geomean_short' you can view the configuration file found under inst/config/splice_method_config for more information

Value

A list object of length 3 containing;

index, a data.frame of the final spliced price index based on the method specified
index_windows, a data.frame containing each individual windows index before splicing
splice_detail, a data.frame containing the breakdown of splice information

Examples

```
tpd_index <- multilateral(period = turvey$month,
                          id = turvey$commodity,
                          price = turvey$price,
                          quantity = turvey$quantity,
                          splice_method = "geomean",
```

```
                    window_length = 13,
                    index_method = "TPD")
```

`splice_update` *Splice update*

Description

Calculate the splice factor

Usage

```
splice_update(old_window, new_window, splice_method)
```

Arguments

`old_window`	vector of numeric values
`new_window`	vector of numeric values
`splice_method`	Method of splicing

Value

A numeric update factor of length 1, based on the `splice_method` provided.

`synthetic_gfk` *Synthetic scanner data for one consumer electronic product*

Description

GfK have made this available as a public good for the international statistical community, to aid research into new price index methods.

Usage

```
synthetic_gfk
```

Format

data frame with 5509 rows and 15 variables

month_num Month number, 0-25

char1-11 Product characteristics

prodid_num Product identifier, created from unique characteristics

quantity The quantity of items sold in that month as an integer

value Sales total (NZD)

Details

The data is based on one product category from the scanner data used in production of the New Zealand Consumers Price Index.

The synthetic data has been heavily modified to remove identification potential, while still retaining some of the characteristics of scanner data which make traditional index methods inadequate - such as high product turnover and volatile price and quantities - which motivate the multilateral index methods that are currently being researched within the international statistical community.

Source

GfK New Zealand

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turvey *Artificial prices of seasonal products Data created by R. Turvey*

Description

The is dataset is presented in the ILO CPI manual. In 1979 Turvey sent his artificial data set to statistical agencies around the world, asking them to use their normal techniques to construct monthly and annual average price indices. About 20 countries replied, and Turvey summarized the responses as follows: "It will be seen that the monthly indices display very large differences, e.g., a range of 129.12–169.50 in June, while the range of simple annual means is much smaller. It will also be seen that the indices vary as to the peak month or year."

Usage

```
turvey
```

Format

data frame with 176 rows and 4 variables

month The time as a Date type

commodity The seasonal product, as a factor (Apples, Grapes, Oranges, Peaches, Strawberries)

price The price as numeric

quantity The quantity of items sold in that month as an integer

Source

https://www.ilo.org/wcmsp5/groups/public/---dgreports/---stat/documents/presentation/wcms_331153.pdf

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