Package 'mosumfvar'

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Type Package

Title Nowcasting Under Structural Breaks

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Description Data segmentation and forecasting methods for VAR-driven dynamic factor models, for application to nowcasting.

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Encoding UTF-8

LazyData true

RoxygenNote 7.1.2

Imports readr

Suggests knitr, rmarkdown

VignetteBuilder knitr

Depends mosumvar, fnets, R (>= 2.10)

R topics documented:

ar.weighted *Fit an autoregressive time series model to the data, using weighted estimators*

Description

Fit an autoregressive time series model to the data, using weighted estimators

Usage

```
ar.weighted(x, cps = NULL, weight.method = c("linear", "exp", "robust"), ...)
```

Arguments

x	matrix of data with series as columns
cps	integer (vector) of estimated change points
weight.method	String of weight method to use
...	further arguments to ar

Value

ar.weighted object, see ar

Examples

```
fm <- fnets::fnets.factor.model((panel$panel), fm.restricted = TRUE, q = 2)
mod <- ar.weighted(fm$factors, cps = 100)
predict(mod, fm$factors, n.ahead = 5)
```

fredmd *Loading FRED-MD Data Set*

Description

fredmd loads the official FRED-MD data set and provides a few tools to manipulate the data set.

Usage

```
fredmd(file = NULL, date_start = NULL, date_end = NULL, transform = TRUE)
```

Arguments

file	Either a path to a file, a connection, or literal data (either a single string or a raw vector).
date_start	Date or NULL, the start date (included) of the data selection. If NULL, select till the latest data available.
date_end	Date or NULL, the end date (included) of the data selection. If NULL, select up to the earliest data available.
transform	logical, indicating Whether or not the FRED-MD data set should be transformed according to the transformation code.

Value

a subset of the (transformed) FRED-MD data of class fredmd.

Author(s)

Yankang (Bennie) Chen <yankang.chen@yale.edu>

References

Michael W. McCracken and Serena Ng (2015), *FRED-MD and FRED-QD: Monthly and Quarterly Databases for Macroeconomic Research*. https://research.stlouisfed.org/econ/mccracken/fred-databases/

Examples

```
fred_data <- fredmd()
```

---

fredqd *Loading FRED-QD Data Set*

Description

fredqd loads the official FRED-QD data set and provides a few tools to manipulate the data set.

Usage

```
fredqd(file = NULL, date_start = NULL, date_end = NULL, transform = TRUE)
```

Arguments

file	Either a path to a file, a connection, or literal data (either a single string or a raw vector).
date_start	Date or NULL, the start date (included) of the data selection. If NULL, select till the latest data available.

date_end	Date or NULL, the end date (included) of the data selection. If NULL, select up to the earliest data available.
transform	logical, indicating Whether or not the FRED-MD data set should be transformed according to the transformation code.

Value

a subset of the (transformed) FRED-MD data of class fredmd.

Author(s)

Yankang (Bennie) Chen <yankang.chen@yale.edu>

References

Michael W. McCracken and Serena Ng (2015), *FRED-MD and FRED-QD: Monthly and Quarterly Databases for Macroeconomic Research*. https://research.stlouisfed.org/econ/mccracken/fred-databases/

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fvar.sim *Simulate from a piecewise stationary factor model with VAR dynamics*

Description

Simulate from a piecewise stationary factor model with VAR dynamics

Usage

```
fvar.sim(
  n,
  p = 100,
  q = 2,
  order = 1,
  cps = c(),
  signal = 0.7,
  error.dist = c("normal", "t", "garch"),
  P1 = NULL,
  Q1 = NULL,
  df = 3
)
```

Arguments

n	sample size
p	number of series
q	factor number
order	VAR order

cps	change points
signal	size of parameters
error.dist	error distribution for VAR and idiosyncratic errors, one of "normal", "t", "garch"
P1	see VAR.sim
Q1	see VAR.sim
df	see VAR.sim

Value

List containing

- x observed series
- f factor series
- e error series
- lam factor loadings
- cps change points

Examples

```
data <- fvar.sim(500, cps = 200)
```

---

get.data *Download nowcasting data*

Description

Downloads monthly and quarterly data from the FRED site

Usage

```
get.data(
  m.file = NULL,
  q.file = NULL,
  y.name = "GDPC1",
  date_start = NULL,
  date_end = NULL,
  transform = TRUE,
  na.rm = TRUE
)
```

Arguments

m.file	Argument to fredmd. Either a path to a file, a connection, or literal data (either a single string or a raw vector)
q.file	Argument to fredqd.
y.name	response variable
date_start	Date or NULL, the start date (included) of the data selection. If NULL, select till the latest data available.
date_end	Date or NULL, the end date (included) of the data selection. If NULL, select up to the earliest data available.
transform	logical, indicating Whether or not the FRED-MD data set should be transformed according to the transformation code.
na.rm	remove rows and colums containing NA

Value

List containing ts objects:

- fmd a subset of the (transformed) FRED-MD data of class fredmd.
- fqd a subset of the (transformed) FRED-QD data of class fredmd.
- y response variable

.

Examples

```
nowcasting_data <- get.data()
```

---

lm.weighted *Fit a linear model to the data, using weighted estimators*

Description

Fit a linear model to the data, using weighted estimators

Usage

```
lm.weighted(
  y,
  x,
  intercept = FALSE,
  cps = NULL,
  weight.method = c("linear", "exp", "robust"),
  ...
)
```

Arguments

y	vector of responses
x	matrix of data with series as columns
intercept	add intercept in regression
cps	integer (vector) of estimated change points
weight.method	String of weight method to use
...	further arguments to lm

Value

lm object, see lm

Examples

```
fm <- fnets::fnets.factor.model((panel$panel), fm.restricted = TRUE, q = 2)
lm.weighted(panel$gdp, fm$factors, cps = 100)
```

---

mosumfvar *Segment data under a factor model with VAR dynamics*

Description

Segment data under a factor model with VAR dynamics

Usage

```
mosumfvar(
  x,
  center = TRUE,
  q = c("ic", "er"),
  order = NULL,
  G = NULL,
  method = c("Score", "Wald"),
  estim = c("C", "H"),
  var.estim = c("Local", "Global"),
  alpha = 0.05,
  criterion = c("eps", "eta"),
  nu = 0.25,
  do.bootstrap = FALSE,
  n.bootstrap = 1000,
  thresh = NULL,
  do.plot = TRUE,
  algo = c("mosumvar", "univ", "ms"),
  rm.cross.terms = TRUE,
  global.resids = TRUE
)
```

Arguments

x	matrix of data with series as columns
center	whether to de-mean the input x
q	Either the number of factors or a string specifying the factor number selection method; possible values are: • "ic" information criteria-based methods of Alessi, Barigozzi & Capasso (2010) when fm.restricted = TRUE or Hallin and Liška (2007) when fm.restricted = FALSE modifying Bai and Ng (2002) • "er" eigenvalue ratio of Ahn and Horenstein (2013) see factor.number.
order	integer VAR model order
G	integer MOSUM bandwidth (or vector, if algo = "ms"); see reference for default
method	detector, one of "Wald", "Score"
estim	estimator method, one of "C", "H"
var.estim	variance estimator method, one of "Local", "Global"
alpha	Numeric significance level
criterion	location procedure, one of "eps", "eta"
nu	Numeric location procedure hyperparameter
do.bootstrap	Boolean, determine threshold via bootstrap method
n.bootstrap	Integer; number of bootstrap replicates
thresh	rejection threshold; see reference for default
do.plot	Boolean, return plot
algo	which algorithm to use, one of "mosumvar","univ","ms"
rm.cross.terms	Boolean, remove cross terms when univ = TRUE
global.resids	Boolean, use residuals from full VAR model when univ = TRUE

Value

List of class mosumfvar, containing

- seg resulting segmentation, a mosumvar object. See mosumvar.
- fm fitted factor model, a fm object. See fnets.factor.model.

Examples

```
mosumfvar(panel$panel, order = 1,  method = "Score", q = 2)
```

panel *Macro and financial data for nowcasting*

Description

Data from NYFED and FRED-MD. Stationarity transforms have been applied as per original sources, other than GDP which has quarter-within-year smoothing.

Usage

```
data(panel)
```

Format

list with panel and gdp components from May 2004 - May 2021

References

Federal Reserve Bank of New York, Nowcasting Report, (NYFED)

Michael W. McCracken and Serena Ng,FRED-MD: A Monthly Database for Macroeconomic Research, (FRED-MD)

Examples

```
data(panel)
panelx <- panel$panel
gdp <- panel$gdp
```

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