

Package ‘frequencyConnectedness’

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Type Package

Title Spectral Decomposition of Connectedness Measures

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Description Accompanies a paper (Barunik, Krehlik (2018) <[doi:10.1093/jjfinec/nby001](https://doi.org/10.1093/jjfinec/nby001)>) dedicated to spectral decomposition of connectedness measures and their interpretation. We implement all the developed estimators as well as the historical counterparts. For more information, see the help or GitHub page (<<https://github.com/tomaskrehlik/frequencyConnectedness>>) for relevant information.

Depends vars, urca, knitr, pbapply

Suggests testthat, stringr, mAr, reshape2, ggplot2, parallel, zoo, BigVAR

Imports methods

License GPL-2

RoxygenNote 7.2.3

BugReports <https://github.com/tomaskrehlik/frequencyConnectedness/issues>

URL <https://github.com/tomaskrehlik/frequencyConnectedness>

NeedsCompilation no

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| | |
|----------------|---|
| collapseBounds | <i>Method for for collapsing bound for frequency spillovers</i> |
|----------------|---|

Description

Method for for collapsing bound for frequency spillovers

Usage

```
collapseBounds(spillover_table, which)
```

Arguments

| | |
|-----------------|--|
| spillover_table | the output of spillover estimation function or rolling spillover estimation function |
| which | integer vector indicating which of the frequency bounds we want to have collapsed |

Value

New spillover object with collapsed bounds

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

| | |
|-------------------------------|------------------------------------|
| collapseBounds.list_of_spills | <i>Function to collapse bounds</i> |
|-------------------------------|------------------------------------|

Description

Taking in list_of_spills, if the individual spillover_tables are frequency based, it allows you to collapse several frequency bands into one.

Usage

```
## S3 method for class 'list_of_spills'  
collapseBounds(spillover_table, which)
```

Arguments

| | |
|-----------------|---|
| spillover_table | a list_of_spills object, ideally from the provided estimation functions |
| which | which frequency bands to collapse. Should be a sequence like 1:2 or 1:5, etc. |

Value

list_of_spills with less frequency bands.

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

collapseBounds.spillover_table
Function to collapse bounds

Description

Taking in spillover_table, if the spillover_table is frequency based, it allows you to collapse several frequency bands into one.

Usage

```
## S3 method for class 'spillover_table'
collapseBounds(spillover_table, which)
```

Arguments

spillover_table a spillover_table object, ideally from the provided estimation functions
which which frequency bands to collapse. Should be a sequence like 1:2 or 1:5, etc.

Value

spillover_table with less frequency bands.

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

exampleSim *The simulated time-series*

Description

The dataset includes three simulated processes with spillover dynamics.

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

| | |
|------|---|
| fevd | <i>Compute a forecast error vector decomposition in recursive identification scheme</i> |
|------|---|

Description

This function computes the standard forecast error vector decomposition given the estimate of the VAR.

Usage

```
fevd(est, n.ahead = 100, no.corr = F)
```

Arguments

| | |
|---------|--|
| est | the VAR estimate from the vars package |
| n.ahead | how many periods ahead should be taken into account |
| no.corr | boolean if the off-diagonal elements should be set to 0. |

Value

a matrix that corresponds to contribution of *i*th variable to *j*th variance of forecast

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

| | |
|---------|--|
| fftFEVD | <i>Compute a FFT transform of forecast error vector decomposition in recursive identification scheme</i> |
|---------|--|

Description

This function computes the decomposition of standard forecast error vector decomposition given the estimate of the VAR. The decomposition is done according to the Stiasny (1996)

Usage

```
fftFEVD(est, n.ahead = 100, no.corr = F, range)
```

Arguments

| | |
|---------|--|
| est | the VAR estimate from the vars package |
| n.ahead | how many periods ahead should be taken into account |
| no.corr | boolean if the off-diagonal elements should be set to 0. |
| range | defines the frequency partitions to which the spillover should be decomposed |

Value

a list of matrices that corresponds to contribution of i th variable to j th variance of forecast

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

 fftGenFEVD

Compute a FFT transform of forecast error vector decomposition in generalised VAR scheme.

Description

This function computes the decomposition of standard forecast error vector decomposition given the estimate of the VAR. The decomposition is done according to the Stiasny (1996)

Usage

```
fftGenFEVD(est, n.ahead = 100, no.corr = F, range)
```

Arguments

| | |
|---------|--|
| est | the VAR estimate from the vars package |
| n.ahead | how many periods ahead should be taken into account |
| no.corr | boolean if the off-diagonal elements should be set to 0. |
| range | defines the frequency partitions to which the spillover should be decomposed |

Value

a list of matrices that corresponds to contribution of i th variable to j th variance of forecast

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

from *Method for computing FROM spillovers*

Description

Method for computing FROM spillovers

Usage

```
from(spillover_table, ...)
```

Arguments

spillover_table
the output of spillover estimation function or rolling spillover estimation function

...
other arguments like whether it is within or absolute spillover in case of the frequency spillovers

Value

Value for FROM spillover

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

from.list_of_spills *Function to compute from spillovers*

Description

Taking in list_of_spillovers, the function computes the from spillovers for all the individual spillover_table.

Usage

```
## S3 method for class 'list_of_spills'
from(spillover_table, within = F, ...)
```

Arguments

spillover_table
a list_of_spills object, ideally from rolling window estimation

within
whether to compute the within spillovers if the spillover tables are frequency based.

...
for the sake of CRAN not to complain

Value

a list containing the from spillovers

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

from.spillover_table *Function to compute from spillovers*

Description

Taking in spillover_table, the function computes the from spillover.

Usage

```
## S3 method for class 'spillover_table'  
from(spillover_table, within = F, ...)
```

Arguments

| | |
|-----------------|---|
| spillover_table | a spillover_table object, ideally from the provided estimation functions |
| within | whether to compute the within spillovers if the spillover tables are frequency based. |
| ... | for the sake of CRAN not to complain |

Value

a list containing the from spillover

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

| | |
|---------|---|
| genFEVD | <i>Compute a forecast error vector decomposition in generalised VAR scheme.</i> |
|---------|---|

Description

This function computes the standard forecast error vector decomposition given the estimate of the VAR. There are common complaints and requests whether the computation is ok and why it does not follow the original Pesaran Shin (1998) article. So let me clear two things out. First, the σ in the equation on page 20 refers to elements of Σ , not standard deviation. Second, the indexing is wrong, it should be σ_{jj} not σ_{ii} . Look, for example, to Diebold and Yilmaz (2012) or ECB WP by Dees, Holly, Pesaran, and Smith (2007) for the correct version.

Usage

```
genFEVD(est, n.ahead = 100, no.corr = F)
```

Arguments

| | |
|---------|--|
| est | the VAR estimate from the vars package |
| n.ahead | how many periods ahead should be taken into account |
| no.corr | boolean if the off-diagonal elements should be set to 0. |

Value

a matrix that corresponds to contribution of i th variable to j th variance of forecast

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

| | |
|------------|---|
| getIndeces | <i>Get the indeces for the individual intervals</i> |
|------------|---|

Description

This function returns the indeces of the vector coming from DFT of time series of length n.ahead that correspond to frequencies in the interval (up, down].

Usage

```
getIndeces(n.ahead, up, down)
```

Arguments

| | |
|---------|--|
| n.ahead | the length of the vector coming out of the DFT |
| up | the upper boundary of the interval |
| down | the lower boundary of the interval |

Author(s)

Tomas Krehlik <tomas.krehlik@sorgmail.com>

getPartition

Get a list of indeces corresponding to parts of frequency partition

Description

This function takes in a vector of numbers denoting the breaks in partition of an interval and returns a list of indeces that correspond to indeces that are contained within an individual intervals. The individual parts then contain (a,b] for all pairs in the interval. Hence if you want pi to be included, the partition should start with something slightly bigger than pi.

Usage

```
getPartition(partition, n.ahead)
```

Arguments

| | |
|-----------|---|
| partition | breaking points of partition of frequency interval, should be ordered decreasingly. |
| n.ahead | how many observations is the FFT done on. |

Value

a list of vectors of indeces corresponding to individual partitions

Author(s)

Tomas Krehlik <tomas.krehlik@sorgmail.com>

net *Method for computing NET spillovers*

Description

Method for computing NET spillovers

Usage

```
net(spillover_table, ...)
```

Arguments

spillover_table the output of spillover estimation function or rolling spillover estimation function

... other arguments like whether it is within or absolute spillover in case of the frequency spillovers

Value

Value for NET spillover

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

net.list_of_spills *Function to compute net spillovers*

Description

Taking in list_of_spillovers, the function computes the net spillovers for all the individual spillover_table.

Usage

```
## S3 method for class 'list_of_spills'
net(spillover_table, within = F, ...)
```

Arguments

spillover_table a list_of_spills object, ideally from rolling window estimation

within whether to compute the within spillovers if the spillover tables are frequency based.

... for the sake of CRAN not to complain

Value

a list containing the net spillovers

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

net.spillover_table *Function to compute net spillovers*

Description

Taking in spillover_table, the function computes the net spillover.

Usage

```
## S3 method for class 'spillover_table'  
net(spillover_table, within = F, ...)
```

Arguments

| | |
|-----------------|---|
| spillover_table | a spillover_table object, ideally from the provided estimation functions |
| within | whether to compute the within spillovers if the spillover tables are frequency based. |
| ... | for the sake of CRAN not to complain |

Value

a list containing the net spillover

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

| | |
|---------|--|
| overall | <i>Method for computing overall spillovers</i> |
|---------|--|

Description

Method for computing overall spillovers

Usage

```
overall(spillover_table, ...)
```

Arguments

| | |
|-----------------|---|
| spillover_table | the output of spillover estimation function or rolling spillover estimation function |
| ... | other arguments like whether it is within or absolute spillover in case of the frequency spillovers |

Value

Value for overall spillover

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

| | |
|------------------------|---|
| overall.list_of_spills | <i>Function to compute overall spillovers</i> |
|------------------------|---|

Description

Taking in list_of_spillovers, the function computes the overall spillovers for all the individual spillover_table.

Usage

```
## S3 method for class 'list_of_spills'  
overall(spillover_table, within = F, ...)
```

Arguments

spillover_table
a list_of_spills object, ideally from rolling window estimation

within
whether to compute the within spillovers if the spillover tables are frequency based.

...
for the sake of CRAN not to complain

Value

a list containing the overall spillovers

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

overall.spillover_table

Function to compute overall spillovers

Description

Taking in spillover_table, the function computes the overall spillover.

Usage

```
## S3 method for class 'spillover_table'  
overall(spillover_table, within = F, ...)
```

Arguments

spillover_table
a spillover_table object, ideally from the provided estimation functions

within
whether to compute the within spillovers if the spillover tables are frequency based.

...
for the sake of CRAN not to complain

Value

a list containing the overall spillover

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

pairwise *Method for computing PAIRWISE spillovers*

Description

Method for computing PAIRWISE spillovers

Usage

```
pairwise(spillover_table, ...)
```

Arguments

spillover_table the output of spillover estimation function or rolling spillover estimation function

... other arguments like whether it is within or absolute spillover in case of the frequency spillovers

Value

Value for PAIRWISE spillover

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

pairwise.list_of_spills
Function to compute pairwise spillovers

Description

Taking in list_of_spillovers, the function computes the pairwise spillovers for all the individual spillover_table.

Usage

```
## S3 method for class 'list_of_spills'
pairwise(spillover_table, within = F, ...)
```

Arguments

spillover_table
a list_of_spills object, ideally from rolling window estimation

within
whether to compute the within spillovers if the spillover tables are frequency based.

...
for the sake of CRAN not to complain

Value

a list containing the pairwise spillovers

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

pairwise.spillover_table

Function to compute pairwise spillovers

Description

Taking in spillover_table, the function computes the pairwise spillover.

Usage

```
## S3 method for class 'spillover_table'  
pairwise(spillover_table, within = F, ...)
```

Arguments

spillover_table
a spillover_table object, ideally from the provided estimation functions

within
whether to compute the within spillovers if the spillover tables are frequency based.

...
for the sake of CRAN not to complain

Value

a list containing the pairwise spillover

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

plotFrom *Method for plotting FROM spillovers*

Description

Method for plotting FROM spillovers

Usage

```
plotFrom(spillover_table, ...)
```

Arguments

```
spillover_table            the output of rolling spillover estimation function
...                        other arguments like whether it is within or absolute spillover in case of the
                            frequency spillovers
```

Value

The plot

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

plotFrom.list_of_spills
Function to plot from spillovers

Description

Taking in list_of_spillovers, the function plots the from spillovers using the zoo::plot.zoo function

Usage

```
## S3 method for class 'list_of_spills'
plotFrom(
  spillover_table,
  within = F,
  which = 1:nrow(spillover_table$list_of_tables[[1]]$tables[[1]]),
  ...
)
```

Arguments

spillover_table a list_of_spills object, ideally from rolling window estimation

within whether to compute the within spillovers if the spillover tables are frequency based.

which a vector with indices specifying which plots to plot.

... for the sake of CRAN not to complain

Value

a plot of from spillovers

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

plotNet

Method for plotting NET spillovers

Description

Method for plotting NET spillovers

Usage

```
plotNet(spillover_table, ...)
```

Arguments

spillover_table the output of rolling spillover estimation function

... other arguments like whether it is within or absolute spillover in case of the frequency spillovers

Value

The plot

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

plotNet.list_of_spills
Function to plot net spillovers

Description

Taking in list_of_spillovers, the function plots the net spillovers using the zoo::plot.zoo function

Usage

```
## S3 method for class 'list_of_spills'  
plotNet(  
  spillover_table,  
  within = F,  
  which = 1:nrow(spillover_table$list_of_tables[[1]]$tables[[1]]),  
  ...  
)
```

Arguments

spillover_table
a list_of_spills object, ideally from rolling window estimation

within
whether to compute the within spillovers if the spillover tables are frequency based.

which
a vector with indices specifying which plots to plot.

...
for the sake of CRAN not to complain

Value

a plot of net spillovers

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

plotOverall *Method for plotting overall spillovers*

Description

Method for plotting overall spillovers

Usage

```
plotOverall(spillover_table, ...)
```

Arguments

`spillover_table`
the output of rolling spillover estimation function

... other arguments like whether it is within or absolute spillover in case of the frequency spillovers

Value

The plot

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

`plotOverall.list_of_spills`

Function to plot overall spillovers

Description

Taking in `list_of_spillovers`, the function plots the overall spillovers using the `zoo::plot.zoo` function

Usage

```
## S3 method for class 'list_of_spills'  
plotOverall(spillover_table, within = F, ...)
```

Arguments

`spillover_table`
a `list_of_spills` object, ideally from rolling window estimation

`within`
whether to compute the within spillovers if the spillover tables are frequency based.

... for the sake of CRAN not to complain

Value

a plot of overall spillovers

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

| | |
|--------------|--|
| plotPairwise | <i>Method for plotting PAIRWISE spillovers</i> |
|--------------|--|

Description

Method for plotting PAIRWISE spillovers

Usage

```
plotPairwise(spillover_table, ...)
```

Arguments

| | |
|-----------------|---|
| spillover_table | the output of rolling spillover estimation function |
| ... | other arguments like whether it is within or absolute spillover in case of the frequency spillovers |

Value

The plot

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

| | |
|-----------------------------|---|
| plotPairwise.list_of_spills | <i>Function to plot pairwise spillovers</i> |
|-----------------------------|---|

Description

Taking in list_of_spillovers, the function plots the pairwise spillovers using the zoo::plot.zoo function

Usage

```
## S3 method for class 'list_of_spills'
plotPairwise(
  spillover_table,
  within = F,
  which = 1:ncol(utils::combn(nrow(spillover_table$list_of_tables[[1]]$tables[[1]]), 2)),
  ...
)
```

Arguments

| | |
|-----------------|---|
| spillover_table | a list_of_spills object, ideally from rolling window estimation |
| within | whether to compute the within spillovers if the spillover tables are frequency based. |
| which | a vector with indices specifying which plots to plot. |
| ... | for the sake of CRAN not to complain |

Value

a plot of pairwise spillovers

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

plotSpecific *Method for plotting specific pair spillover*

Description

Method for plotting specific pair spillover

Usage

```
plotSpecific(spillover_table, ...)
```

Arguments

| | |
|-----------------|---|
| spillover_table | the output of rolling spillover estimation function |
| ... | other arguments like which specific pair to plot. |

Value

The plot

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

`plotSpecific.list_of_spills`*Function to plot specific spillover from i to j*

Description

Taking in `list_of_spillovers`, the function plots the spillover from `i` to `j` using the `zoo::plot.zoo` function

Usage

```
## S3 method for class 'list_of_spills'  
plotSpecific(spillover_table, i, j, ...)
```

Arguments

| | |
|------------------------------|--|
| <code>spillover_table</code> | a <code>list_of_spills</code> object, ideally from rolling window estimation |
| <code>i</code> | from variable |
| <code>j</code> | to variable |
| <code>...</code> | for the sake of CRAN not to complain |

Value

a plot of pairwise spillovers

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

`plotTo`*Method for plotting TO spillovers*

Description

Method for plotting TO spillovers

Usage

```
plotTo(spillover_table, ...)
```

Arguments

| | |
|------------------------------|---|
| <code>spillover_table</code> | the output of rolling spillover estimation function |
| <code>...</code> | other arguments like whether it is within or absolute spillover in case of the frequency spillovers |

Value

The plot

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

plotTo.list_of_spills *Function to plot to spillovers*

Description

Taking in list_of_spillovers, the function plots the to spillovers using the zoo::plot.zoo function

Usage

```
## S3 method for class 'list_of_spills'
plotTo(
  spillover_table,
  within = F,
  which = 1:nrow(spillover_table$list_of_tables[[1]]$tables[[1]]),
  ...
)
```

Arguments

| | |
|-----------------|---|
| spillover_table | a list_of_spills object, ideally from rolling window estimation |
| within | whether to compute the within spillovers if the spillover tables are frequency based. |
| which | a vector with indices specifying which plots to plot. |
| ... | for the sake of CRAN not to complain |

Value

a plot of to spillovers

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

print.list_of_spills *Function to not print the list_of_spills object*

Description

Usually it is not a good idea to print the list_of_spills object, hence this function implements warning and shows how to print them individually if the user really wants to.

Usage

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

Arguments

x a list_of_spills object, ideally from the provided estimation functions
... for the sake of CRAN not to complain

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

print.spillover_table *Function to print the spillover table object*

Description

The function takes as an argument the spillover_table object and prints it nicely to the console. While doing that it also computes all the necessary measures.

Usage

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

Arguments

x a spillover_table object, ideally from the provided estimation functions
... for the sake of CRAN not to complain

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

 spillover

Computing spillover from a fevd

Description

This function is an internal implementation of the spillover. The spillover is in general defined as the contribution of the other variables to the fevd of the self variable. This function computes the spillover as the contribution of the diagonal elements of the fevd to the total sum of the matrix. The other functions are just wrappers around this function. In general, other spillovers could be implemented using this function.

Usage

```
spillover(func, est, n.ahead, no.corr = F)
```

Arguments

| | |
|---------|--|
| func | name of the function that returns FEVD for the estimate est |
| est | the estimate of a system, typically VAR estimate in our case |
| n.ahead | how many periods ahead should the FEVD be computed, generally this number should be high enough so that it won't change with additional period |
| no.corr | boolean parameter whether the off-diagonal in the covariance matrix should be set to zero |

Value

spillover_table object

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

 spilloverBK09

Computing the decomposed spillover from a fevd as defined by Barunik, Krehlik (2018)

Description

This function is an internal implementation of the frequency spillover. We apply the identification scheme suggested by fevd to the frequency decomposition of the transfer functions from the estimate est.

Usage

```
spilloverBK09(est, n.ahead = 100, no.corr, partition)
```

Arguments

| | |
|-----------|--|
| est | the estimate of a system, typically VAR estimate in our case |
| n.ahead | how many periods ahead should the FEVD be computed, generally this number should be high enough so that it won't change with additional period |
| no.corr | boolean parameter whether the off-diagonal in the covariance matrix should be set to zero |
| partition | defines the frequency partitions to which the spillover should be decomposed |

Value

spillover_table object

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

spilloverBK12

Computing the decomposed spillover from a generalized fevd as defined by Barunik, Krehlik (2018)

Description

This function is an internal implementation of the frequency spillover. We apply the identification scheme suggested by fevd to the frequency decomposition of the transfer functions from the estimate est.

Usage

```
spilloverBK12(est, n.ahead = 100, no.corr, partition)
```

Arguments

| | |
|-----------|--|
| est | the estimate of a system, typically VAR estimate in our case |
| n.ahead | how many periods ahead should the FEVD be computed, generally this number should be high enough so that it won't change with additional period |
| no.corr | boolean parameter whether the off-diagonal in the covariance matrix should be set to zero |
| partition | defines the frequency partitions to which the spillover should be decomposed |

Value

spillover_table object

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

| | |
|---------------|---|
| spilloverDY09 | <i>Computing spillover from a fevd according to Diebold Yilmaz (2009)</i> |
|---------------|---|

Description

This function is an internal implementation of the spillover. The spillover is in general defined as the contribution of the other variables to the fevd of the self variable. This function computes the spillover as the contribution of the diagonal elements of the fevd to the total sum of the matrix. The other functions are just wrappers around this function. In general, other spillovers could be implemented using this function.

Usage

```
spilloverDY09(est, n.ahead = 100, no.corr)
```

Arguments

| | |
|---------|--|
| est | the estimate of a system, typically VAR estimate in our case |
| n.ahead | how many periods ahead should the FEVD be computed, generally this number should be high enough so that it won't change with additional period |
| no.corr | boolean parameter whether the off-diagonal in the covariance matrix should be set to zero |

Value

spillover_table object

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

| | |
|---------------|---|
| spilloverDY12 | <i>Computing spillover from a generalized fevd according to Diebold Yilmaz (2012)</i> |
|---------------|---|

Description

This function is an internal implementation of the spillover. The spillover is in general defined as the contribution of the other variables to the fevd of the self variable. This function computes the spillover as the contribution of the diagonal elements of the fevd to the total sum of the matrix. The other functions are just wrappers around this function. In general, other spillovers could be implemented using this function.

Usage

```
spilloverDY12(est, n.ahead = 100, no.corr)
```

Arguments

| | |
|---------|--|
| est | the estimate of a system, typically VAR estimate in our case |
| n.ahead | how many periods ahead should the FEVD be computed, generally this number should be high enough so that it won't change with additional period |
| no.corr | boolean parameter whether the off-diagonal in the covariance matrix should be set to zero |

Value

spillover_table object

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

 spilloverFft

Computing the decomposed spillover from a fevd

Description

This function is an internal implementation of the frequency spillover. We apply the identification scheme suggested by fevd to the frequency decomposition of the transfer functions from the estimate est.

Usage

```
spilloverFft(func, est, n.ahead, partition, no.corr = F)
```

Arguments

| | |
|-----------|--|
| func | name of the function that returns FEVD for the estimate est |
| est | the estimate of a system, typically VAR estimate in our case |
| n.ahead | how many periods ahead should the FEVD be computed, generally this number should be high enough so that it won't change with additional period |
| partition | defines the frequency partitions to which the spillover should be decomposed |
| no.corr | boolean parameter whether the off-diagonal in the covariance matrix should be set to zero |

Value

spillover_table object

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

spilloverRolling *Computing rolling spillover*

Description

This function computes the rolling spillover using the standard VAR estimate. We implement the parallel version for faster processing. The window is of fixed window and is rolled over the data. Interpretation of the other parameters is the same as in the standard computation of spillover. For usage, see how spilloverRollingDY09, etc. are implemented.

Usage

```
spilloverRolling(
  func_spill,
  params_spill,
  func_est,
  params_est,
  data,
  window,
  cluster = NULL,
  check_data = TRUE
)
```

Arguments

| | |
|--------------|---|
| func_spill | name of the function that returns FEVD for the estimate est |
| params_spill | parameters from spillover estimation function as a list |
| func_est | name of the estimation function |
| params_est | parameters from the estimation function as a list |
| data | variable containing the dataset |
| window | length of the window to be rolled |
| cluster | either NULL for no parallel processing or the variable containing the cluster. |
| check_data | whether to check the data for NAs before starting estimation. Typically should be left true unless the underlying estimate is providing a way how to infer those NAs. |

Value

A corresponding spillover value on a given frequency band, ordering of bands corresponds to the ordering of original bounds.

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

spilloverRollingBK09 *Computing rolling frequency spillover from a fevd as defined by Barunik, Krehlik (2018)*

Description

This function computes the rolling spillover using the standard VAR estimate. We implement the parallel version for faster processing. The window is of fixed window and is rolled over the data. Interpretation of the other parameters is the same as in the standard computation of spillover.

Usage

```
spilloverRollingBK09(  
  data,  
  n.ahead = 100,  
  no.corr,  
  partition,  
  func_est,  
  params_est,  
  window,  
  cluster = NULL  
)
```

Arguments

| | |
|------------|--|
| data | variable containing the dataset |
| n.ahead | how many periods ahead should the FEVD be computed, generally this number should be high enough so that it won't change with additional period |
| no.corr | boolean parameter whether the off-diagonal in the covariance matrix should be set to zero |
| partition | how to split up the estimated spillovers into frequency bands. Should be a vector of bound points that starts with 0 and ends with $\pi+0.00001$. |
| func_est | estimation function, usually would be VAR or BigVAR function to estimate the multivariate system |
| params_est | parameters passed to the estimation function, as a list, for parameters refer to documentation of the estimating function |
| window | length of the window to be rolled |
| cluster | either NULL for no parallel processing or the variable containing the cluster. |

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

spilloverRollingBK12 *Computing rolling frequency spillover from a generalized fevd as defined by Barunik, Krehlik (2018)*

Description

This function computes the rolling spillover using the standard VAR estimate. We implement the parallel version for faster processing. The window is of fixed window and is rolled over the data. Interpretation of the other parameters is the same as in the standard computation of spillover.

Usage

```
spilloverRollingBK12(
  data,
  n.ahead = 100,
  no.corr,
  partition,
  func_est,
  params_est,
  window,
  cluster = NULL
)
```

Arguments

| | |
|------------|--|
| data | variable containing the dataset |
| n.ahead | how many periods ahead should the FEVD be computed, generally this number should be high enough so that it won't change with additional period |
| no.corr | boolean parameter whether the off-diagonal in the covariance matrix should be set to zero |
| partition | defines the frequency partitions to which the spillover should be decomposed |
| func_est | a name of the function to estimate with, for example "var" for VAR from vars package |
| params_est | a list of the parameters to pass to the function besides the data that are passed as a first element. |
| window | length of the window to be rolled |
| cluster | either NULL for no parallel processing or the variable containing the cluster. |

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

spilloverRollingDY09 *Computing rolling spillover according to Diebold Yilmaz (2009)*

Description

This function computes the rolling spillover using the standard VAR estimate. We implement the parallel version for faster processing. The window is of fixed window and is rolled over the data. Interpretation of the other parameters is the same as in the standard computation of spillover.

Usage

```
spilloverRollingDY09(  
  data,  
  n.ahead = 100,  
  no.corr,  
  func_est,  
  params_est,  
  window,  
  cluster = NULL  
)
```

Arguments

| | |
|------------|--|
| data | variable containing the dataset |
| n.ahead | how many periods ahead should the FEVD be computed, generally this number should be high enough so that it won't change with additional period |
| no.corr | boolean parameter whether the off-diagonal in the covariance matrix should be set to zero |
| func_est | estimation function, usually would be VAR or BigVAR function to estimate the multivariate system |
| params_est | parameters passed to the estimation function, as a list, for parameters refer to documentation of the estimating function |
| window | length of the window to be rolled |
| cluster | either NULL for no parallel processing or the variable containing the cluster. |

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

spilloverRollingDY12 *Computing rolling spillover from the generalized fevd according to Diebold Yilmaz (2012)*

Description

This function computes the rolling spillover using the standard VAR estimate. We implement the parallel version for faster processing. The window is of fixed window and is rolled over the data. Interpretation of the other parameters is the same as in the standard computation of spillover.

Usage

```
spilloverRollingDY12(  
  data,  
  n.ahead = 100,  
  no.corr,  
  func_est,  
  params_est,  
  window,  
  cluster = NULL  
)
```

Arguments

| | |
|------------|--|
| data | variable containing the dataset |
| n.ahead | how many periods ahead should the FEVD be computed, generally this number should be high enough so that it won't change with additional period |
| no.corr | boolean parameter whether the off-diagonal in the covariance matrix should be set to zero |
| func_est | estimation function, usually would be VAR or BigVAR function to estimate the multivariate system |
| params_est | parameters passed to the estimation function, as a list, for parameters refer to documentation of the estimating function |
| window | length of the window to be rolled |
| cluster | either NULL for no parallel processing or the variable containing the cluster. |

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

to *Method for computing TO spillovers*

Description

Method for computing TO spillovers

Usage

```
to(spillover_table, ...)
```

Arguments

spillover_table the output of spillover estimation function or rolling spillover estimation function

... other arguments like whether it is within or absolute spillover in case of the frequency spillovers

Value

Value for TO spillover

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

to.list_of_spills *Function to compute to spillovers*

Description

Taking in list_of_spillovers, the function computes the to spillovers for all the individual spillover_table.

Usage

```
## S3 method for class 'list_of_spills'
to(spillover_table, within = F, ...)
```

Arguments

spillover_table a list_of_spills object, ideally from rolling window estimation

within whether to compute the within spillovers if the spillover tables are frequency based.

... for the sake of CRAN not to complain

Value

a list containing the to spillovers

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

to.spillover_table *Function to compute to spillovers*

Description

Taking in spillover_table, the function computes the to spillover.

Usage

```
## S3 method for class 'spillover_table'
to(spillover_table, within = F, ...)
```

Arguments

spillover_table a spillover_table object, ideally from the provided estimation functions

within whether to compute the within spillovers if the spillover tables are frequency based.

... for the sake of CRAN not to complain

Value

a list containing the to spillover

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

volatilities *Volatilities from Ox Man Institute*

Description

The dataset includes median realised volatilities of some financial indices

Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

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