Package ‘nardl’

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Type Package

Title Nonlinear Cointegrating Autoregressive Distributed Lag Model

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Description Computes the nonlinear cointegrating autoregressive distributed lag model with automatic bases aic and bic lags selection of independent variables proposed by (Shin, Yu & Greenwood-Nimmo, 2014 <doi:10.1007/978-1-4899-8008-3_9>).

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Encoding UTF-8

LazyData true

RoxygenNote 7.0.2

Imports stats, strucchange, tseries, Formula, gtools, car, MASS

Suggests testthat

BugReports https://github.com/zedtaha/nardl/issues

URL https://github.com/zedtaha/nardl

NeedsCompilation no

Repository CRAN

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R topics documented:

ArchTest *ARCH test*

Description

Computes the Lagrange multiplier test for conditional heteroscedasticity of Engle (1982), as described by Tsay (2005, pp. 101-102).

Usage

```
ArchTest(x, lags = 12, demean = FALSE)
```

Arguments

x	numeric vector
lags	positive integer number of lags
demean	logical: If TRUE, remove the mean before computing the test statistic.

Examples

```
reg<-nardl(food~inf,fod,ic="aic",maxlag = 4,graph = TRUE,case=3)
x<-reg$selresidu
nlag<-reg$nl
ArchTest(x,lags=nlag)
```

bp2 *LM test for serial correlation*

Description

LM test for serial correlation

Usage

```
bp2(object, nlags, fill = NULL, type = c("F", "Chi2"))
```

Arguments

object	fitted lm model
nlags	positive integer number of lags
fill	starting values for the lagged residuals in the auxiliary regression. By default 0.
type	Fisher or Chisquare statistics

Examples

```
reg<-nardl(food~inf,fod,ic="aic",maxlag = 4,graph = TRUE,case=3)
lm2<-bp2(reg$fits,reg$nl,fill=0,type="F")
```

---

cumsq *Function cumsq*

Description

Function cumsq

Usage

```
cumsq(e, k, n)
```

Arguments

e	is the recursive errors
k	is the estimated coefficients length
n	is the recursive errors length

Examples

```
reg<-nardl(food~inf,fod,ic="aic",maxlag = 4,graph = TRUE,case=3)
e<-reg$rece
k<-reg$k
n<-reg$n
cumsq(e=e,k=k,n=n)
```

---

cusum *Function cusum*

Description

Function cusum

Usage

```
cusum(e, k, n)
```

Arguments

e	is the recursive errors
k	is the estimated coefficients length
n	is the recursive errors length

Examples

```
reg<-nardl(food~inf,fod,ic="aic",maxlag = 4,graph = TRUE,case=3)
e<-reg$rece
k<-reg$k
n<-reg$n
cusum(e=e,k=k,n=n)
```

`fod` *Indian yearly data of inflation rate and percentage food import to total import*

Description

The data frame `fod` contains the following variables:

- food: percentage food import to total import
- inf: inflation rate
- year: the year

Usage

```
data(fod)
```

Format

A data frame with 54 rows and 2 variables `nardl` *Nonlinear ARDL function*

Description

Nonlinear ARDL function

Usage

```
nardl(formula, data, ic = c("aic", "bic"), maxlag = 4, graph = FALSE, case = 3)
```

Arguments

`formula`	food~inf or food~inf|I(inf^2)
`data`	the dataframe
`ic`	: c("aic","bic") criteria model selection
`maxlag`	maximum lag number
`graph`	TRUE to show stability tests plot
`case`	case number 3 for (unrestricted intercert, no trend) and 5 (unrestricted intercept, unrestricted trend), 1 2 and 4 not supported

Examples

```
############################################
# Fit the nonlinear cointegrating autoregressive distributed lag model
############################################
# Load data
data(fod)
############################################
# example 1:auto selected lags (maxlags=TRUE)
############################################
reg<-nardl(food~inf,fod,ic="aic",maxlag = 4,graph = FALSE,case=3)
summary(reg)

############################################
# example 2: Cusum and CusumQ plot (graph=TRUE)
############################################
reg<-nardl(food~inf,fod,ic="aic",maxlag = 4,graph = TRUE,case=3)
```

pssbounds *pssbounds*

Description

display the necessary critical values to conduct the Pesaran, Shin and Smith 2001 bounds test for cointegration. See http://andyphilips.github.io/pssbounds/.

Usage

```
pssbounds(obs, fstat, tstat = NULL, case, k)
```

Arguments

`obs`	number of observations
`fstat`	value of the F-statistic
`tstat`	value of the t-statistic
`case`	case number
`k`	number of regressors appearing in lag levels

Details

pssbounds is a module to display the necessary critical values to conduct the Pesaran, Shin and Smith (2001) bounds test for cointegration. Critical values using the F-test are the default; users can also include the critical values of the t-test with the tstat parameter.

As discussed in Philips (2016), the upper and lower bounds of the cointegration test are non-standard, and depend on the number of observations, the number of regressors appearing in levels, and the restrictions (if any) placed on the intercept and trend. Asymptotic critical values are provided by Pesaran, Shin, and Smith (2001), and small-sample critical values by Narayan (2005). The following five cases are possible: I (no intercept, no trend), II (restricted intercept, no trend), III (unrestricted intercept, no trend), IV (unrestricted intercept, restricted trend), V (unrestricted intercept, unrestricted trend). See Pesaran, Shin and Smith (2001) for more details; Case III is the most common.

More details are available at http://andyphilips.github.io/pssbounds/.

Value

None

Author(s)

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Andrew Q Philips, <aphilips@pols.tamu.edu>

References

If you use pssbounds, please cite:

Jordan, Soren and Andrew Q. Philips. "pss: Perform bounds test for cointegration and perform dynamic simulations."

and

Philips, Andrew Q. "Have your cake and eat it too? Cointegration and dynamic inference from autoregressive distributed lag models" Working Paper.

Narayan, Paresh Kumar. 2005. "The Saving and Investment Nexus for China: Evidence from Cointegration Tests." Applied Economics 37(17):1979-1990.

Pesaran, M Hashem, Yongcheol Shin and Richard J Smith. 2001. "Bounds testing approaches to the analysis of level relationships." Journal of Applied Econometrics 16(3):289-326.

Examples

```
reg<-nardl(food~inf,fod,ic="aic",maxlag = 4,graph = TRUE,case=3)
pssbounds(case=reg$case,fstat=reg$fstat,obs=reg$Nobs,k=reg$k)
# F-stat concludes I(1) and cointegrating, t-stat concludes I(0).
```

---

summary.nardl *Summary of a nardl model*

Description

`summary` method for a `nardl` model.

Usage

```
## S3 method for class 'nardl'
summary(object, ...)
```

Arguments

`object`	is the object of the function
`...`	not used

Value

an object of the S3 class `summary.nardl` with the following components:

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