Package ‘nardl’

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Title Nonlinear Cointegrating Autoregressive Distributed Lag Model
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Nardl-package  
Nonlinear Cointegrating Autoregressive Distributed Lag Model

Description

Computes the nonlinear cointegrating autoregressive distributed lag model with p lags of the dependent variable and q lags of independent variables proposed by (Shin, Yu & Greenwood-Nimmo, 2014 <doi:10.1007/978-1-4899-8008-3_9>).

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In this package, we apply the ordinary least squares method to estimate the cointegrating nonlinear ARDL (NARDL) model in which short and long-run nonlinearities are introduced via positive and negative partial sum decompositions of the explanatory variables. Besides, we provide the CUSUM, CUSUMSQ model stability tests, model selection via aic, bic and rsquared criteria and the dynamic multipliers plot.

Author(s)

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References


Description

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 = "aic", maxlags = TRUE, graph = TRUE, case = 3)
x <- reg$selresid
nlag <- reg$np
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 Chi-square statistics

Examples

reg <- nardl(food ~ inf, fod = "aic", maxlags = TRUE, graph = TRUE, case = 3)
lm2 <- bp2(reg$fit, reg$np, fill = 0, type = "F")
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", maxlags = TRUE, graph = TRUE, case=3)
e<-reg$rece
k<-reg$k
n<-reg$n
cumsq(e=e, k=k, n=n)

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

```r
reg <- nardl(food ~ inf, fod, ic = "aic", maxlags = TRUE, graph = TRUE, case = 3)
e <- reg$e
k <- reg$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**

```r
data(fod)
```  

**Format**

A data frame with 54 rows and 2 variables

---

**nardl**  
*Nonlinear ARDL function*

---

**Description**

Nonlinear ARDL function

**Usage**

```r
nardl(formula, data, p = NULL, q = NULL, ic = c("aic", "bic", "ll", "R2"), maxlags = TRUE, graph = FALSE, case = 3)
```
plotmplier

Dynamic multiplier plot

Description

Dynamic multiplier plot

Usage

plotmplier(model, np, k, h)
Arguments

- **model**: the fitted model
- **np**: the selected number of lags
- **k**: number of decomposed independent variables
- **h**: is the horizon over which multipliers will be computed

Examples

```r
# Dynamic multipliers plot
# Load data
data(fod)
reg<-nardl(food~infLp=4,q=4,fod,ic="aic",maxlags = FALSE,graph = TRUE,case=3)
plotmultiplier(reg,reg$np,1,10)
```

Description

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

Usage

```r
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>, people.tamu.edu/~aphilips/

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.


Examples

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

```r
## 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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