

nardl Package

An R package to estimate the nonlinear cointegrating autoregressive distributed lag model

Specifying the Model

Possible syntaxes for specifying the variables in the model:

- **nardl with fixed p and q lags**

```
nardl(food~inf,p,q,data=fod,ic="aic",maxlags = FALSE,graph = FALSE,case=3)
```

- **Auto selected lags (maxlags=TRUE)**

```
nardl(food~inf,data=fod,ic="aic",maxlags = TRUE,graph = FALSE,case=3)
```

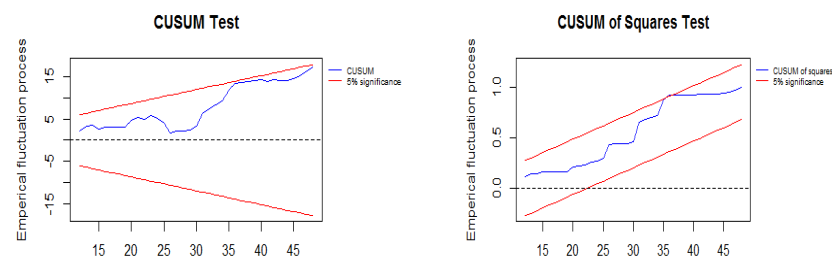
The formula:

- $y \sim x \mid z_1 + z_2 \dots$
- y the dependent variable
- x the decomposed variable (this package version can't assume more than one decomposed variable)
- $z_1 + z_2 + \dots$ independent variables
- **Data** is the dataframe
- **p** number of lags of the dependent variable
- **q** number of lags of the independent variables
- **ic** : c("aic", "bic", "ll", "R2") criteria model selection
- **maxlags** if **TRUE** auto lags selection
- **case** case number 3 for (unrestricted intercept, no trend) and 5 (unrestricted intercept, unrestricted trend), 1 2 and 4 not supported

Cusum and CusumQ plot

Cusum and CusumQ plot (graph=TRUE)

```
nardl(food~inf,data=fod,ic="aic",maxlags = TRUE,graph = TRUE,case=3)
```



Cointegration bounds test

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

pssbounds specification include:

- **Case** case number 3 for (unrestricted intercept, no trend) and 5 (unrestricted intercept, unrestricted trend), 1 2 and 4 not supported
- **fstat** represent the value of the F-statistic
- **obs** represent the number of observation
- **k** number of regressors appearing in lag levels

Example:

```
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)
```

LM test for serial correlation

LM test for serial correlation

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

Methods and options are:

- **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

Example :

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

```
bp2(reg$fit,reg$np,fill=0,type="F")
```

Lagrange multiplier test

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

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

Methods and options are:

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

Example :

```
reg<-nardl(food~inf,fod,ic="aic",maxlags = TRUE,graph = TRUE,case=3)
x<-reg$residu
nlag<-reg$np
ArchTest(x,lags=nlag)
```

Dynamic multipliers plot

Dynamic multiplier plot

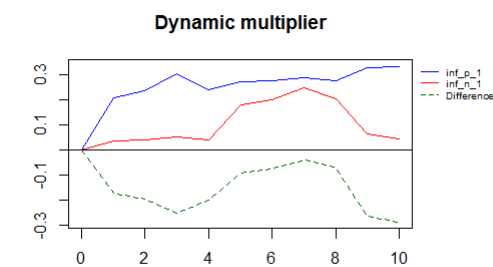
```
plotmplier(model, np, k, h)
```

Methods and options are:

- **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

Example

```
reg<-nardl(food~inf,p=4,q=4,fod,ic="aic",maxlags = FALSE,graph = TRUE,case=3)
plotmplier(reg,reg$np,1,10)
```



pssbounds

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

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

Methods and options are:

- **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

Example

```
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).
```