Example 4-1

September 12, 2020

[ ]:
```r
# install the following packages and library
install.packages("plm")
install.packages("splm")

library("plm")
```

[5]:
```r
##---------------------------------Block 1--------------------------------

#### Example 4-1 ####

## ------------------------------------------------------------------
data("RiceFarms", package = "splm")
Rice <- pdata.frame(RiceFarms, index = "id")

# within model
rice.w <- plm(log(goutput) ~ log(seed) + log(totlabor) + log(size), Rice)

# pooled model
rice.p <- update(rice.w, model = "pooling")

# two-ways within effect model
rice.wd <- plm(log(goutput) ~ log(seed) + log(totlabor) + log(size), Rice,
               effect = "twoways")

## ------------------------------------------------------------------

# F test with two fitted models
pFtest(rice.w, rice.p)

## ------------------------------------------------------------------

# additionally, the F test can be run given a formula and data
pFtest(log(goutput) ~ log(seed) + log(totlabor) + log(size), Rice)
```

```
F test for individual effects

data:  log(goutput) ~ log(seed) + log(totlabor) + log(size)
F = 1.6623, df1 = 170, df2 = 852, p-value = 2.786e-06
```

```
alternative hypothesis: significant effects


F test for individual effects

data:  log(goutput) ~ log(seed) + log(totlabor) + log(size)
F = 1.6623, df1 = 170, df2 = 852, p-value = 2.786e-06
alternative hypothesis: significant effects
```

[6]:
```
##---------------------------------Block 2---------------------------------

# F test for twoways effects
pFtest(rice.wd, rice.p)

## ------------------------------------------------------------------
pFtest(log(goutput) ~ log(seed) + log(totlabor) + log(size), Rice,
       effect = "twoways")
```

```
F test for twoways effects

data:  log(goutput) ~ log(seed) + log(totlabor) + log(size)
F = 4.2604, df1 = 175, df2 = 847, p-value < 2.2e-16
alternative hypothesis: significant effects


F test for twoways effects

data:  log(goutput) ~ log(seed) + log(totlabor) + log(size)
F = 4.2604, df1 = 175, df2 = 847, p-value < 2.2e-16
alternative hypothesis: significant effects
```

[7]:
```
##---------------------------------Block 3---------------------------------

# F test for models absent of time effects, but individual effects are present
pFtest(rice.wd, rice.w)
```

```
F test for twoways effects

data:  log(goutput) ~ log(seed) + log(totlabor) + log(size)
F = 69.779, df1 = 5, df2 = 847, p-value < 2.2e-16
alternative hypothesis: significant effects
```

[9]:
```
##---------------------------------Block 4---------------------------------

# plmtest() is the Breusch and Pagan (1980) test.
# Honda (1985) test is the default test
# like the F test, plmtest() argument can be an OLS model or the formula and␣
 ↪data
# for the direction of the effects, must enter an argument for the effects␣
 ↪option
plmtest(rice.p)
plmtest(log(goutput)~log(seed)+log(totlabor)+log(size), Rice)
```

```
Lagrange Multiplier Test - (Honda) for balanced panels

data:  log(goutput) ~ log(seed) + log(totlabor) + log(size)
normal = 4.8396, p-value = 6.507e-07
alternative hypothesis: significant effects



Lagrange Multiplier Test - (Honda) for balanced panels

data:  log(goutput) ~ log(seed) + log(totlabor) + log(size)
normal = 4.8396, p-value = 6.507e-07
alternative hypothesis: significant effects
```

[10]:
```
##---------------------------------Block 5---------------------------------

plmtest(rice.p, effect = "time")
```

```
Lagrange Multiplier Test - time effects (Honda) for balanced panels

data:  log(goutput) ~ log(seed) + log(totlabor) + log(size)
normal = 58.682, p-value < 2.2e-16
alternative hypothesis: significant effects
```

[11]:
```
##---------------------------------Block 6---------------------------------

plmtest(rice.p, effect = "twoways")
```

```
Lagrange Multiplier Test - two-ways effects (Honda) for balanced
panels

data:  log(goutput) ~ log(seed) + log(totlabor) + log(size)
normal = 44.917, p-value < 2.2e-16
alternative hypothesis: significant effects
```

[12]:
```
##---------------------------------Block 7---------------------------------

# two different extentions: King and Wu (1997) and Gourieroux et al. (1982)
plmtest(rice.p, effect = "twoways", type = "kw")
plmtest(rice.p, effect = "twoways", type = "ghm")
```

```
Lagrange Multiplier Test - two-ways effects (King and Wu) for balanced
panels

data:  log(goutput) ~ log(seed) + log(totlabor) + log(size)
normal = 58.656, p-value < 2.2e-16
alternative hypothesis: significant effects


Lagrange Multiplier Test - two-ways effects (Gourieroux, Holly and
Monfort) for balanced panels

data:  log(goutput) ~ log(seed) + log(totlabor) + log(size)
chibarsq = 3467, df0 = 0.00, df1 = 1.00, df2 = 2.00, w0 = 0.25, w1 =
0.50, w2 = 0.25, p-value < 2.2e-16
alternative hypothesis: significant effects
```