Example 5-14

September 12, 2020

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

library("plm")
library("lmtest")
```

[10]:
```
##---------------------------------Block 1---------------------------------

#### Example 5-14 ####

## ------------------------------------------------------------------------
data("RiceFarms", package = "splm")
RiceFarms <- transform(RiceFarms,
                       phosphate = phosphate / 1000,
                       pesticide = as.numeric(pesticide > 0))

fm <- log(goutput) ~ log(seed) + log(urea) + phosphate +
    log(totlabor) + log(size) + pesticide + varieties +
        + region + time

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

# generalized GLS model
gglsmodrice <- pggls(fm, RiceFarms, model = "pooling", index = "id")
summary(gglsmodrice)
```

```
Oneway (individual) effect General FGLS model

Call:
pggls(formula = fm, data = RiceFarms, model = "pooling", index = "id")

Balanced Panel: n = 171, T = 6, N = 1026

Residuals:
    Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
-0.93155 -0.22853  0.01514  0.00000  0.21466  1.37404
```

```
Coefficients:
                   Estimate Std. Error  z-value  Pr(>|z|)
(Intercept)        5.333353   0.178804  29.8279 < 2.2e-16 ***
log(seed)          0.128532   0.024054   5.3435 9.115e-08 ***
log(urea)          0.135104   0.015107   8.9434 < 2.2e-16 ***
phosphate          0.703962   0.252581   2.7871  0.005319 **
log(totlabor)      0.209946   0.026460   7.9344 2.114e-15 ***
log(size)          0.500018   0.028134  17.7728 < 2.2e-16 ***
pesticide          0.035544   0.024527   1.4492  0.147292
varietieshigh      0.135093   0.034484   3.9176 8.945e-05 ***
varietiesmixed     0.103074   0.044614   2.3103  0.020870 *
regionlangan      -0.045117   0.047216  -0.9556  0.339294
regiongunungwangi  0.013995   0.053222   0.2630  0.792586
regionmalausma     0.019975   0.054132   0.3690  0.712129
regionsukaambit    0.067096   0.052932   1.2676  0.204944
regionciwangi      0.163292   0.053026   3.0795  0.002074 **
time2             -0.032827   0.026201  -1.2529  0.210237
time3             -0.204919   0.031562  -6.4926 8.437e-11 ***
time4             -0.343978   0.028475 -12.0798 < 2.2e-16 ***
time5              0.057595   0.028707   2.0063  0.044825 *
time6              0.044129   0.031267   1.4114  0.158139
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Total Sum of Squares: 1013.9
Residual Sum of Squares: 100.56
Multiple R-squared: 0.90082
```

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

# joint restriction test
waldtest(gglsmodrice, "region")
```

Res.Df	Df	Chisq	Pr(>Chisq)
1007	NA	NA	NA
1012	-5	28.84922	2.482142e-05

[8]:
```r
##---------------------------------Block 3---------------------------------

# fixed effects generalized GLS model
feglsmodrice <- pggls(update(fm, . ~ . - region), RiceFarms, index = "id")

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

# Hausman test
phtest(gglsmodrice, feglsmodrice)
```

```
Hausman Test
```

```
data:  fm
chisq = 18.395, df = 13, p-value = 0.1431
alternative hypothesis: one model is inconsistent
```

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

# Hausman test for an updated generalized GLS model omitting regional fixed␣
 ↪effects
phtest(pggls(update(fm, . ~ . - region), RiceFarms,
             model = "pooling", index = "id"),
       feglsmodrice)
```

```
Hausman Test

data:  update(fm, . ~ . - region)
chisq = 19.399, df = 13, p-value = 0.1112
alternative hypothesis: one model is inconsistent
```