Example 3-4

September 12, 2020

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

library("plm")
library("texreg")
```

[3]:
```
##---------------------------------Block 1---------------------------------

#### Example 3-4 ####

# the following two paragraphs of code are examples of how to find the␣
 ↪identifier variable
# in a data set

## ------------------------------------------------------------------------
data("RiceFarms", package = "plm")
head(RiceFarms, 2)

## ------------------------------------------------------------------------
R1 <- pdata.frame(RiceFarms, index = c(id = "id", time = NULL, group =␣
 ↪"region"))
R2 <- pdata.frame(RiceFarms, index = c(id = "id", group = "region"))
R3 <- pdata.frame(RiceFarms, index = c("id", group = "region"))
head(index(R1))
```

id	size	status	varieties	bimas	seed	urea	phosphate	pesticide	pseed	purea	pphosph	hirec
101001	3	owner	mixed	mixed	90	900	80	6000	80	75	75	2875
101001	2	owner	trad	mixed	40	600	0	3000	70	75	75	2110

id	time	region
101001	1	wargabinangun
101001	2	wargabinangun
101001	3	wargabinangun
101001	4	wargabinangun
101001	5	wargabinangun
101001	6	wargabinangun

[4]:
```r
##---------------------------------Block 2---------------------------------

# nested effects random effect model
data("Produc", package = "plm")
nswar <- plm(log(gsp) ~ log(pc) + log(emp) + log(hwy) + log(water) +
                log(util) + unemp, data = Produc,
             model = "random", effect = "nested",
             random.method = "swar", index = c(group = "region"))
summary(nswar)
```

```
Nested effects Random Effect Model
   (Swamy-Arora's transformation)

Call:
plm(formula = log(gsp) ~ log(pc) + log(emp) + log(hwy) + log(water) +
    log(util) + unemp, data = Produc, effect = "nested", model = "random",
    random.method = "swar", index = c(group = "region"))

Balanced Panel: n = 48, T = 17, N = 816

Effects:
                   var  std.dev share
idiosyncratic 0.001352 0.036765 0.191
individual    0.004278 0.065410 0.604
group         0.001455 0.038148 0.205
theta:
            Min.   1st Qu.     Median       Mean    3rd Qu.       Max.
id    0.86492676 0.8649268 0.86492676 0.86492676 0.86492676 0.86492676
group 0.03960556 0.0466931 0.05713605 0.05577645 0.06458029 0.06458029

Residuals:
     Min.   1st Qu.    Median      Mean   3rd Qu.      Max.
-0.106171 -0.024805 -0.001816 -0.000054  0.019795  0.182810

Coefficients:
               Estimate  Std. Error z-value  Pr(>|z|)
(Intercept)  2.08921088  0.14570204 14.3389 < 2.2e-16 ***
log(pc)      0.27412419  0.02054440 13.3430 < 2.2e-16 ***
log(emp)     0.73983766  0.02575046 28.7311 < 2.2e-16 ***
log(hwy)     0.07273624  0.02202509  3.3024 0.0009585 ***
log(water)   0.07645327  0.01385767  5.5170 3.448e-08 ***
log(util)   -0.09437398  0.01677289 -5.6266 1.838e-08 ***
unemp       -0.00616304  0.00090331 -6.8227 8.933e-12 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares:    43.035
```

```
Residual Sum of Squares: 1.1245
R-Squared:      0.97387
Adj. R-Squared: 0.97368
Chisq: 20213.5 on 6 DF, p-value: < 2.22e-16
```

[5]:
```r
##---------------------------------Block 3---------------------------------

#update the model to use other estimates of the variances of the error␣
 ↪components
namem <- update(nswar, random.method = "amemiya")
nwalhus <- update(nswar, random.method = "walhus")
iswar <- update(nswar, effect = "individual")
iwith <- update(nswar, model = "within", effect = "individual")

# creates a table summarizing the results.
screenreg(list("fe-id" = iwith, "re-id" = iswar,
               "Swamy_Arora" = nswar, "Wallas-Hussein" = nwalhus,
               "Amemiya" = namem), digits = 3)
```

'\n==
fe-id re-id Swamy_Arora Wallas-Hussein Amemiya \n--------------------------
--------------------------\nlog(pc) 0.235 *** 0.273 *** 0.274 *** 0.273 *** 0.264 ***\n (0.026)
(0.020) (0.021) (0.021) (0.022) \nlog(emp) 0.801 *** 0.749 *** 0.740 *** 0.742 *** 0.758
***\n (0.030) (0.025) (0.026) (0.026) (0.027) \nlog(hwy) 0.077 * 0.062 ** 0.073 *** 0.075
*** 0.072 ** \n (0.031) (0.022) (0.022) (0.022) (0.024) \nlog(water) 0.079 *** 0.076 ***
0.076 *** 0.076 *** 0.076 ***\n (0.015) (0.014) (0.014) (0.014) (0.014) \nlog(util) -0.115
*** -0.098 *** -0.094 *** -0.095 *** -0.102 ***\n (0.018) (0.017) (0.017) (0.017) (0.017)
\nunemp -0.005 *** -0.006 *** -0.006 *** -0.006 *** -0.006 ***\n (0.001) (0.001) (0.001)
(0.001) (0.001) \n(Intercept) 2.168 *** 2.089 *** 2.082 *** 2.131 ***\n (0.143) (0.146) (0.150)
(0.160) \n--
-\nR^2 0.946 0.961 0.974 0.972 0.968 \nAdj. R^2 0.942 0.961 0.974 0.972 0.968 \nNum. obs. 816 816 816 816
816 \ns_idios 0.037 0.037 0.038 0.037 \ns_id 0.082 0.065 0.067 0.083 \ns_gp 0.038 0.052 0.047
\n==
p < 0.001; ** p < 0.01; * p < 0.05\n'