

Examples 5-11 & 5-12 & 5-13

September 12, 2020

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

library("plm")
```

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

#### Example 5-11 ####

## -----
data("EmplUK", package = "plm")

# pggls() is the generalized GLS model
gglsmode <- pggls(log(emp) ~ log(wage) + log(capital),
                 data = EmplUK, model = "pooling")
summary(gglsmode)
```

Oneway (individual) effect General FGLS model

Call:

```
pggls(formula = log(emp) ~ log(wage) + log(capital), data = EmplUK,
      model = "pooling")
```

Unbalanced Panel: n = 140, T = 7-9, N = 1031

Residuals:

Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
-1.80696	-0.36552	0.06181	0.03230	0.44279	1.58719

Coefficients:

	Estimate	Std. Error	z-value	Pr(> z)
(Intercept)	2.023480	0.158468	12.7690	< 2.2e-16 ***
log(wage)	-0.232329	0.048001	-4.8401	1.298e-06 ***
log(capital)	0.610484	0.017434	35.0174	< 2.2e-16 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares: 1853.6

Residual Sum of Squares: 402.55

Multiple R-squared: 0.78283

```
[6]: ##-----Block 2-----  
  
# table of the correlations between residuals  
round(gglsmod$sigma, 3)
```

	1976	1977	1978	1979	1980	1981	1982	1983	1984
1976	0.307	0.291	0.277	0.269	0.252	0.254	0.247	0.303	0.362
1977	0.291	0.303	0.296	0.294	0.275	0.259	0.251	0.272	0.428
1978	0.277	0.296	0.299	0.301	0.280	0.264	0.256	0.280	0.433
1979	0.269	0.294	0.301	0.314	0.291	0.273	0.263	0.287	0.452
1980	0.252	0.275	0.280	0.291	0.282	0.265	0.254	0.279	0.426
1981	0.254	0.259	0.264	0.273	0.265	0.266	0.254	0.279	0.447
1982	0.247	0.251	0.256	0.263	0.254	0.254	0.262	0.291	0.473
1983	0.303	0.272	0.280	0.287	0.279	0.279	0.291	0.300	0.486
1984	0.362	0.428	0.433	0.452	0.426	0.447	0.473	0.486	0.505

```
[7]: ##-----Block 3-----  
  
#### Example 5-12 ####  
  
## -----  
  
# fixed effects generalized GLS  
feglsmod <- pggls(log(emp) ~ log(wage) + log(capital), data = EmplUK,  
                  model = "within")  
summary(feglsmod)
```

Oneway (individual) effect Within FGLS model

Call:

```
pggls(formula = log(emp) ~ log(wage) + log(capital), data = EmplUK,  
      model = "within")
```

Unbalanced Panel: n = 140, T = 7-9, N = 1031

Residuals:

Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
-0.508362	-0.074254	-0.002442	0.000000	0.076139	0.601442

Coefficients:

	Estimate	Std. Error	z-value	Pr(> z)
log(wage)	-0.617617	0.030794	-20.056	< 2.2e-16 ***
log(capital)	0.561049	0.017185	32.648	< 2.2e-16 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares: 1853.6
 Residual Sum of Squares: 17.368
 Multiple R-squared: 0.99063

```
[8]: ##-----Block 4-----  
  
# Hausman test  
phptest(feglsmod, gglsmod)
```

Hausman Test

data: $\log(\text{emp}) \sim \log(\text{wage}) + \log(\text{capital})$
 chisq = 1064.6, df = 2, p-value < 2.2e-16
 alternative hypothesis: one model is inconsistent

```
[9]: ##-----Block 5-----  
  
#### Example 5-13 ####  
  
## -----  
  
# first differenced generalized GLS  
fdglsmod <- pggls(log(emp) ~ log(wage) + log(capital), data = EmplUK,  
                  model = "fd")  
summary(fdglsmod)
```

Oneway (individual) effect First-Difference FGLS model

Call:

```
pggls(formula = log(emp) ~ log(wage) + log(capital), data = EmplUK,  
      model = "fd")
```

Unbalanced Panel: n = 140, T = 7-9, N = 1031

Residuals:

Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
-0.738461	-0.052092	0.004422	-0.005268	0.048895	0.687202

Coefficients:

	Estimate	Std. Error	z-value	Pr(> z)
(Intercept)	-0.023453	0.003329	-7.0449	1.856e-12 ***
log(wage)	-0.312877	0.037385	-8.3692	< 2.2e-16 ***
log(capital)	0.371186	0.019820	18.7283	< 2.2e-16 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares: 1853.6
Residual Sum of Squares: 11
Multiple R-squared: 0.99407