Example 6-4

September 11, 2020

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

     library("plm")

     # import the data and run the following model from example 6-2
     data("ForeignTrade", package = "pder")

     r1b <- plm(imports ~ pmcpi + gnp + lag(imports) + lag(resimp) |
                 lag(consump) + lag(cpi) + lag(income) + lag(px) +
                 lag(reserves) + lag(exports) | lag(gnp) + pm +
                 lag(invest) + lag(money) + gnpw + pw  + trend + pgnp,
                 ForeignTrade, model = "random", inst.method = "baltagi",
                 random.method = "nerlove", random.dfcor = c(1, 1))
```

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

     #### Example 6-4 ####

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

     # models for import and export demand
     eqimp <- imports ~ pmcpi + gnp + lag(imports) +
                 lag(resimp) | lag(consump) + lag(cpi) + lag(income) +
                 lag(px) + lag(reserves) + lag(exports) | lag(gnp) + pm +
                 lag(invest) + lag(money) + gnpw + pw  + trend + pgnp
     eqexp <- exports ~ pxpw + gnpw + lag(exports) |
                 lag(gnp) + pw + lag(consump) + pm + lag(px) + lag(cpi) |
                 lag(money) + gnpw +  pgnp + pop + lag(invest) +
                 lag(income) + lag(reserves) + exrate

     # error components 3SLS model
     r12 <- plm(list(import.demand = eqimp,
                 export.demand = eqexp),
             data = ForeignTrade, index = 31, model = "random",
             inst.method = "baltagi", random.method = "nerlove",
```

1

```
            random.dfcor = c(1, 1))

summary(r12)
```

Oneway (individual) effect Random Effect Model
   (Nerlove's transformation)
Call:
plm.list(formula = list(import.demand = eqimp, export.demand = eqexp),
    data = ForeignTrade, model = "random", random.method = "nerlove",
    inst.method = "baltagi", index = 31, ... = pairlist(random.dfcor = c(1,
        1)))

Balanced Panel: n = 31, T = 24, N = 744

Effects:

  Estimated standard deviations of the error
      import.demand export.demand
id   0.061871   0.078159
idios   0.143934   0.120007

  Estimated correlation matrix of the individual effects
              import.demand export.demand
import.demand   1.000   .
export.demand   0.138   1

  Estimated correlation matrix of the idiosyncratic effects
              import.demand export.demand
import.demand   1.000000   .
export.demand   0.097493   1

 - import.demand
               Estimate Std. Error t-value Pr(>|t|)
(Intercept)   0.3987408 0.1189935 3.3509 0.0008266 ***
pmcpi   -0.0540741 0.0217007 -2.4918 0.0128231 *
gnp   0.0110320 0.0053078 2.0784 0.0378497 *
lag(imports) 0.9504604 0.0118726 80.0549 < 2.2e-16 ***
lag(resimp)   0.0394789 0.0063424 6.2246 6.347e-10 ***

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

 - export.demand
               Estimate Std. Error t-value Pr(>|t|)
(Intercept)   0.143674   0.139492 1.0300 0.303195
pxpw   -0.061469   0.019467 -3.1576 0.001624 **
gnpw   0.114402   0.053359 2.1440 0.032201 *
lag(exports) 0.946533   0.013310 71.1143 < 2.2e-16 ***
```

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

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

# compares the EC2SLS estimate from example 6-2 with the EC3SLS estimate
rbind(ec2sls = coef(summary(r1b))[-1, 2],
      ec3sls = coef(summary(r12), "import.demand")[-1, 2])
```

	pmcpi	gnp	lag(imports)	lag(resimp)
ec2sls	0.02180217	0.006998615	0.01288882	0.006708722
ec3sls	0.02170074	0.005307839	0.01187260	0.006342416