Example 6-2

September 11, 2020

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

library("plm")
```

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

#### Example 6-2 ####

## ------------------------------------------------------------------------
data("ForeignTrade", package = "pder")

# within model
w1 <- plm(imports~pmcpi + gnp + lag(imports) + lag(resimp)  |
          lag(consump) + lag(cpi) + lag(income) + lag(gnp) + pm +
          lag(invest) + lag(money) + gnpw + pw + lag(reserves) +
          lag(exports) + trend + pgnp + lag(px),
          ForeignTrade, model = "within")

# error corrected 2SLS model
r1 <- update(w1, model = "random", random.method = "nerlove",
             random.dfcor = c(1, 1), inst.method = "baltagi")

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

# Hausman test
phtest(r1, w1)
```

```
Hausman Test

data:  imports ~ pmcpi + gnp + lag(imports) + lag(resimp) | lag(consump) +  ...
chisq = 10.629, df = 4, p-value = 0.03106
alternative hypothesis: one model is inconsistent
```

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

# Kinal and Lahiri (1993) model
# Considers two types of instruments. The first are those not correlated with␣
 ↪individual effects and can
# be used twice using within an between transformations
# The second are those correlated with the individual effects and can only be␣
 ↪used
# in within transformations

# the second argument indicates the doubly exogenous instruments
# the third are the simply exogenous instruments
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))

# Hausman test
phtest(w1, r1b)
```

```
Hausman Test

data:  imports ~ pmcpi + gnp + lag(imports) + lag(resimp) | lag(consump) +  ...
chisq = 7.1486, df = 4, p-value = 0.1282
alternative hypothesis: one model is inconsistent
```

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

# results of the within and EC2SLS models
rbind(within = coef(w1), ec2sls = coef(r1b)[-1])
```

	pmcpi	gnp	lag(imports)	lag(resimp)
within	-0.05873374	0.02890065	0.9512149	0.05215182
ec2sls	-0.05419773	0.01361175	0.9482115	0.04195281

[6]:
```
##---------------------------------Block 4---------------------------------

# measures of elasticity from the model
elast <- sapply(list(w1, r1, r1b),
                function(x) c(coef(x)["pmcpi"],
                              coef(x)["pmcpi"] / (1 - coef(x)["lag(imports)"])))
dimnames(elast) <- list(c("ST", "LT"), c("w1", "r1", "r1b"))
elast
```

	w1	r1	r1b
ST	-0.05873374	-0.05519734	-0.05419773
LT	-1.20392829	-1.19529901	-1.04651970

[7]:
```
##---------------------------------Block 5---------------------------------

rbind(within = coef(summary(w1))[, 2],
      ec2sls = coef(summary(r1b))[-1, 2])
```

	pmcpi	gnp	lag(imports)	lag(resimp)
within	0.02915262	0.041235082	0.03066695	0.008257449
ec2sls	0.02180217	0.006998615	0.01288882	0.006708722