

Example 6-3

September 11, 2020

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

library("plm")
```

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

#### Example 6-3 ####

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

## -----

# OLS and fixed effects model
ols <- plm(trade ~ gdp + dist + rer + rlf + sim + cee + emu + bor + lan,
  ↪TradeEU,
  model = "pooling", index = c("pair", "year"))
fe <- update(ols, model = "within")
fe
```

Model Formula: trade ~ gdp + dist + rer + rlf + sim + cee + emu + bor + lan

Coefficients:

	gdp	rer	rlf	sim	cee	emu
	1.812493	0.060980	0.032508	1.172255	0.309336	0.085209

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

# random effects model
re <- update(fe, model = "random")
re
```

Model Formula: trade ~ gdp + dist + rer + rlf + sim + cee + emu + bor + lan

Coefficients:

(Intercept)	gdp	dist	rer	rlf	sim
-13.930299	1.794872	-0.590930	0.068990	0.033412	1.142659
cee	emu	bor	lan		
0.318183	0.092652	0.441449	0.417179		

```
[5]: ##-----Block 3-----  
  
# Hausman test  
phtest(re, fe)
```

Hausman Test

data: trade ~ gdp + dist + rer + rlf + sim + cee + emu + bor + lan
chisq = 13.337, df = 6, p-value = 0.03798
alternative hypothesis: one model is inconsistent

```
[6]: ##-----Block 4-----  
  
# ht1 and ht2 are Hausman-Taylor estimators (Hausman and Taylor 1981)  
# ht1: the only doubly exogenous variable is the real exchange rate (rer)  
# ht2: domestic product (gdp) and relative factor endowment (rlf) are also  
→ instruments  
ht1 <- plm(trade ~ gdp + dist + rer + rlf + sim + cee + emu + bor + lan |  
           rer + dist + bor | gdp + rlf + sim + cee + emu + lan ,  
           data = TradeEU, model = "random", index = c("pair", "year"),  
           inst.method = "baltagi", random.method = "ht")  
ht2 <- update(ht1, trade ~ gdp + dist + rer + rlf + sim + cee + emu + bor + lan,  
→ |  
           rer + gdp + rlf + dist + bor | sim + cee + emu + lan)  
  
## -----  
  
# Hausman tests for ht1 and ht2  
phtest(ht1, fe)  
phtest(ht2, fe)
```

Hausman Test

data: trade ~ gdp + dist + rer + rlf + sim + cee + emu + bor + lan | ...
chisq = 5.9429e-24, df = 6, p-value = 1
alternative hypothesis: one model is inconsistent

Hausman Test

```
data: trade ~ gdp + dist + rer + rlf + sim + cee + emu + bor + lan | ...  
chisq = 2.2405, df = 6, p-value = 0.8963  
alternative hypothesis: one model is inconsistent
```

```
[7]: ##-----Block 5-----  
  
# Hausman-Taylor estimator using the instruments used by Amemiya and MaCurdy,  
↪ (1986)  
ht2am <- update(ht2, inst.method = "am")  
  
## -----  
phtest(ht2am, fe)
```

Hausman Test

```
data: trade ~ gdp + dist + rer + rlf + sim + cee + emu + bor + lan | ...  
chisq = 10.195, df = 6, p-value = 0.1167  
alternative hypothesis: one model is inconsistent
```