[Example 14-4] Random Effect model

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```
load("~/計量経済学演習/R data sets for 5e/wagepan.RData")
wagepan<-data
library(plm);library(stargazer)
```

```
## Loading required package: Formula
```

```
##
## Please cite as:
```

```
##  Hlavac, Marek (2018). stargazer: Well-Formatted Regression and Summary Statistics Tables.
```

```
##  R package version 5.2.2. https://CRAN.R-project.org/package=stargazer
```

```
wagepan.p <- pdata.frame(wagepan, index=c("nr","year") )
```

```
#basic info of panel data frame
pdim(wagepan.p)
```

```
## Balanced Panel: n = 545, T = 8, N = 4360
```

Check variation of variables within individuals to ommit time constant variables

```
pvar(wagepan.p)
```

```
## no time variation:       nr black hisp educ
## no individual variation: year d81 d82 d83 d84 d85 d86 d87
```

Estimate different models

```
wagepan.p$yr<-factor(wagepan.p$year) #transform year(numeric) into factors
```

pooled OLS

```
reg.ols<- (plm(lwage~educ+black+hisp+exper+I(exper^2)+married+union+yr,
                        data=wagepan.p, model="pooling") )
```

Random Effect model

```
reg.re <- (plm(lwage~educ+black+hisp+exper+I(exper^2)+married+union+yr,
                        data=wagepan.p, model="random") )
```

Fixed Effect model

```
reg.fe <- (plm(lwage~                I(exper^2)+married+union+yr,
                        data=wagepan.p, model="within") )
```

```
stargazer(reg.ols,reg.re,reg.fe, type="text",
       column.labels=c("OLS","RE","FE"),keep.stat=c("n","rsq"),
       keep=c("ed","bl","hi","exp","mar","un")) #display regressors except year dummy
```

```
##
## ===============================================
##                   Dependent variable:
##               ----------------------------
##                          lwage
##                 OLS      RE       FE
##                 (1)      (2)      (3)
## -----------------------------------------------
## educ          0.091***  0.092***
##              (0.005)   (0.011)
##
## black        -0.139*** -0.139***
##              (0.024)   (0.048)
##
## hisp          0.016     0.022
##              (0.021)   (0.043)
##
## exper         0.067***  0.106***
##              (0.014)   (0.015)
##
## I(exper2)    -0.002*** -0.005*** -0.005***
##              (0.001)   (0.001)   (0.001)
##
## married       0.108***  0.064***   0.047**
##              (0.016)   (0.017)   (0.018)
##
## union         0.182***  0.106***  0.080***
##              (0.017)   (0.018)   (0.019)
##
## -----------------------------------------------
## Observations   4,360     4,360     4,360
## R2             0.189     0.181     0.181
## ===============================================
## Note:           *p<0.1; **p<0.05; ***p<0.01
```

Hausman Test (RE vs FE)

```
phtest(reg.fe, reg.re)
```

```
##
##  Hausman Test
##
## data:  lwage ~ I(exper^2) + married + union + yr
## chisq = 26.361, df = 10, p-value = 0.003284
## alternative hypothesis: one model is inconsistent
```

null hypothesis that RE model(estimator) is consistent is rejected with significance level at 1%.