[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 Summar
y 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 factor
s
```

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 ex
cept 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%.