HW0519_311707021_丁振朝

Q15.6

f.

EXPER 在 FE 跟 RE 差異最明顯，表示 RE 估計有偏應用 RE

Hausman = 15.36 卡方檢定=9.49，拒絕 H0

Q15.17

b.

```
Balanced Panel: n = 40, T = 3, N = 120

Effects:
                 var std.dev share
idiosyncratic 0.9640  0.9819 0.571
individual    0.7251  0.8515 0.429
theta: 0.4459

Residuals:
     Min.   1st Qu.    Median   3rd Qu.      Max.
-2.263634 -0.697383  0.078697  0.552680  2.225798

Coefficients:
             Estimate Std. Error z-value  Pr(>|z|)
(Intercept) 0.9690324  0.5210052  1.8599 0.0628957 .
income      0.0265755  0.0070126  3.7897 0.0001508 ***
```

其中信賴區間不包含 0=不拒絕 H0

c.

```
        Lagrange Multiplier Test - (Breusch-Pagan)

data:  liquor ~ income
chisq = 20.68, df = 1, p-value = 5.429e-06
alternative hypothesis: significant effects
```

拒絕 H0 應用 RE 模型

d.

```
Balanced Panel: n = 40, T = 3, N = 120

Effects:
                 var std.dev share
idiosyncratic 0.9640  0.9819 0.571
individual    0.7251  0.8515 0.429
theta: 0.4459

Residuals:
     Min.   1st Qu.    Median   3rd Qu.      Max.
-2.300955 -0.703840  0.054992  0.560255  2.257325

Coefficients:
             Estimate Std. Error z-value Pr(>|z|)
(Intercept) 0.9163337  0.5524439  1.6587  0.09718 .
income      0.0207421  0.0209083  0.9921  0.32117
incomem     0.0065792  0.0222048  0.2963  0.76700
```

不顯著顯示 income 和個體隨機有相關性，可用 RE

Q15.20

d.

大多解釋變數在 RE 中有顯著性，顯示變數與學生閱讀表現具有相關性。同時存在異質性因此應該用 RE

e.

```
> print(t_stats)
     small       aide   tchexper white_asian   freelunch        boy
     1.146      0.128     -1.938      1.218      -0.096        NaN
> library(dplyr)
```

```
        Hausman Test

data:  readscore ~ small + aide + tchexper + white_asian + freelunch +  ...
chisq = 13.809, df = 6, p-value = 0.03184
alternative hypothesis: one model is inconsistent
```

卡方檢定 12.59，應該拒絕 H0。用 FE 模型

f.

```
                var std.dev share
idiosyncratic 756.11   27.50 0.817
individual    169.40   13.02 0.183
theta:
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.6593  0.7327  0.7615  0.7630  0.7892  0.8217

Residuals:
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
-98.886 -17.051  -3.166   0.039  12.846 193.321

Coefficients:
              Estimate Std. Error  z-value  Pr(>|z|)
(Intercept) 459.462989  20.529888  22.3802 < 2.2e-16 ***
small         6.637460   0.922068   7.1985 6.090e-13 ***
aide          1.157620   0.889542   1.3014    0.1931
tchexper      0.289286   0.071754   4.0316 5.539e-05 ***
boy          -5.386109   0.735063  -7.3274 2.346e-13 ***
white_asian   8.081423   1.550155   5.2133 1.855e-07 ***
freelunch   -14.699025   0.892109 -16.4767 < 2.2e-16 ***
small_m     -18.410060  22.273923  -0.8265    0.4085
aide_m       16.811358  20.793685   0.8085    0.4188
tchexper_m    1.006007   0.625690   1.6078    0.1079
boy_m       -53.353521  25.221654  -2.1154    0.0344 *
white_asian_m -6.648191   6.320012  -1.0519    0.2928
freelunch_m   -3.318853   8.779553  -0.3780    0.7054
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares:    6007200
Residual Sum of Squares: 4281300
R-Squared:      0.28737
Adj. R-Squared: 0.28586
Chisq: 500.306 on 12 DF, p-value: < 2.22e-16
```

只有性別係數顯著，和學校 individual effect 具相關性

Boy 則不符合 RE 外生性假設，應該用 FE