Example 5-2

September 12, 2020

```r
# install the following package and libraries
install.packages("plm")

library("plm")
library("lmtest")
library("sandwich")
```

```r
[4]:    ##-------------------------------Block 1-------------------------------

        #### Example 5-2 ####

        ## -----------------------------------------------------------------
        data("Hedonic", package = "plm")
        hfm <- mv ~ crim + zn + indus + chas + nox + rm + age + dis +
            rad + tax + ptratio + blacks + lstat

        ## -----------------------------------------------------------------
        # ols model with HC SE's using lm()
        hlmmod <- lm(hfm, Hedonic)
        coeftest(hlmmod, vcov = vcovHC)
```

t test of coefficients:

```
                Estimate  Std. Error t value   Pr(>|t|)
(Intercept)   9.7565e+00  1.7358e-01 56.2084  < 2.2e-16 ***
crim         -1.1865e-02  2.8547e-03 -4.1564 3.813e-05 ***
zn            8.0307e-05  3.8941e-04  0.2062  0.836699
indus         2.4069e-04  1.8384e-03  0.1309  0.895890
chasyes       9.1384e-02  3.7108e-02  2.4627  0.014133 *
nox          -6.3817e-03  1.2564e-03 -5.0792 5.389e-07 ***
rm            6.3325e-03  2.1095e-03  3.0020  0.002819 **
age           8.9802e-05  6.0736e-04  0.1479  0.882517
dis          -1.9131e-01  4.0777e-02 -4.6916 3.518e-06 ***
rad           9.5711e-02  2.0315e-02  4.7112 3.208e-06 ***
tax          -4.2042e-04  1.1706e-04 -3.5913  0.000362 ***
ptratio      -3.1119e-02  4.1652e-03 -7.4713 3.653e-13 ***
blacks        3.6379e-01  1.5438e-01  2.3565  0.018839 *
lstat        -3.7105e-01  3.9362e-02 -9.4264  < 2.2e-16 ***
```

```
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

[3]:
```
##--------------------------------Block 2--------------------------------

# pooled ols model using plm()
hplmmod <- plm(hfm, Hedonic, model = "pooling", index = "townid")

# compare White SE's vs clustered SE's
sign.tab <- cbind(coef(hlmmod), coeftest(hlmmod, vcov = vcovHC)[,4],
                  coeftest(hplmmod, vcov = vcovHC)[, 4])
dimnames(sign.tab)[[2]] <- c("Coefficient", "p-values, HC", "p-val., cluster")
round(sign.tab, 3)
```

	Coefficient	p-values, HC	p-val., cluster
(Intercept)	9.756	0.000	0.000
crim	-0.012	0.000	0.000
zn	0.000	0.837	0.882
indus	0.000	0.896	0.933
chasyes	0.091	0.014	0.064
nox	-0.006	0.000	0.003
rm	0.006	0.003	0.090
age	0.000	0.883	0.914
dis	-0.191	0.000	0.004
rad	0.096	0.000	0.000
tax	0.000	0.000	0.005
ptratio	-0.031	0.000	0.000
blacks	0.364	0.019	0.235
lstat	-0.371	0.000	0.000