HW2 경영경제자료분석

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#install.packages("plm")  
library(plm)  
library(lmtest)

setwd("C:/Users/HS/Documents/GitHub/Statistics-for-Management-and-Economy")  
fatality.data<- read.csv("3\_fatality.csv", header = TRUE)  
fatality<- fatality.data  
names(fatality)

## [1] "state" "year" "spircons" "unrate" "perinc" "emppop"   
## [7] "beertax" "sobapt" "mormon" "mlda" "dry" "yngdrv"   
## [13] "vmiles" "breath" "jaild" "comserd" "allmort" "mrall"   
## [19] "allnite" "mralln" "allsvn" "a1517" "mra1517" "a1517n"   
## [25] "mra1517n" "a1820" "a1820n" "mra1820" "mra1820n" "a2124"   
## [31] "mra2124" "a2124n" "mra2124n" "aidall" "mraidall" "pop"   
## [37] "pop1517" "pop1820" "pop2124" "miles" "unus" "epopus"   
## [43] "gspch"

### Table8.1 식(4), 식(6)에서

### ln income 대신 (ln income)^2, (ln income)^3으로 해서 Beertax 효과 추정하고 95% 신뢰구간 구하기

* Drinking age 18은 drinking age (데이터 변수명 : mlda)=18이면 1, 아니면 0인 Dummy변수입니다.
* Drinking age 19은 drinking age (데이터 변수명 : mlda)=19이면 1, 아니면 0인 Dummy변수입니다.
* Drinking age 20은 drinking age (데이터 변수명 : mlda)=20이면 1, 아니면 0인 Dummy변수입니다.
* Mandatory jail or community service은 Mandatory jail(데이터 변수명 : jaild) 또는 community service(데이터 변수명 : comserd )가 1이면 1이고 Mandatory jail 와 community service가 모두 0이면 0인 Dummy 변수 입니다.

## 변수 확인

#variables  
attach(fatality)  
  
summary(mrall) #fatalityrate

## Min. 1st Qu. Median Mean 3rd Qu. Max.   
## 8.212e-05 1.624e-04 1.956e-04 2.040e-04 2.418e-04 4.218e-04

summary(beertax) #beertax

## Min. 1st Qu. Median Mean 3rd Qu. Max.   
## 0.04331 0.20885 0.35259 0.51326 0.65157 2.72076

table(year) #year

## year  
## 1982 1983 1984 1985 1986 1987 1988   
## 48 48 48 48 48 48 48

table(state) #state

## state  
## 1 4 5 6 8 9 10 12 13 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31   
## 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7   
## 32 33 34 35 36 37 38 39 40 41 42 44 45 46 47 48 49 50 51 53 54 55 56   
## 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7

summary(vmiles) #Average miles per driver

## Min. 1st Qu. Median Mean 3rd Qu. Max.   
## 4576 7183 7796 7891 8504 26148

summary(perinc) #per capita personal income

## Min. 1st Qu. Median Mean 3rd Qu. Max.   
## 9514 12086 13763 13880 15175 22193

summary(unrate) #unemployment rate

## Min. 1st Qu. Median Mean 3rd Qu. Max.   
## 2.400 5.475 7.000 7.347 8.900 18.000

summary(unus) #us unemployment rate

## Min. 1st Qu. Median Mean 3rd Qu. Max.   
## 5.500 6.200 7.200 7.529 9.600 9.700

table(mlda) #drinking age

## mlda  
## 18 19 20 21   
## 15 60 29 232

table(jaild) #mandatory jail

## jaild  
## 0 1   
## 241 94

table(comserd) #community service

## comserd  
## 0 1   
## 273 62

detach(fatality)

# 변수만들기

#Fatality rate  
fatality$frate <- with(fatality, allmort/pop \* 10000)  
  
#Dummy variable  
fatality$age18<- ifelse(fatality$mlda ==18, 1, 0) #drinking age 18  
fatality$age19<- ifelse(fatality$mlda ==19, 1, 0) #drinking age 19  
fatality$age20<- ifelse(fatality$mlda ==20, 1, 0) #drinking age 18  
fatality$manOrcom <- ifelse(fatality$jaild==1 | fatality$comserd==1 , 1, 0)  
  
table(fatality$age18)

##   
## 0 1   
## 321 15

table(fatality$age19)

##   
## 0 1   
## 276 60

table(fatality$age20)

##   
## 0 1   
## 307 29

table(fatality$manOrcom)

##   
## 0 1   
## 227 108

#(ln Income)\*\*2 ,(ln Income)\*\*3   
fatality$lninc2 <- log(fatality$perinc)\*\*2  
fatality$lninc3 <- log(fatality$perinc)\*\*3  
  
names(fatality)

## [1] "state" "year" "spircons" "unrate" "perinc" "emppop"   
## [7] "beertax" "sobapt" "mormon" "mlda" "dry" "yngdrv"   
## [13] "vmiles" "breath" "jaild" "comserd" "allmort" "mrall"   
## [19] "allnite" "mralln" "allsvn" "a1517" "mra1517" "a1517n"   
## [25] "mra1517n" "a1820" "a1820n" "mra1820" "mra1820n" "a2124"   
## [31] "mra2124" "a2124n" "mra2124n" "aidall" "mraidall" "pop"   
## [37] "pop1517" "pop1820" "pop2124" "miles" "unus" "epopus"   
## [43] "gspch" "frate" "age18" "age19" "age20" "manOrcom"  
## [49] "lninc2" "lninc3"

## Table 8.1

fatalityrate ~ beertax + Drinkingage18 + Drinkingage19 + Drinkingage20 + Mandatory jailor community service? + Average vehicle miles per driver + unemployment rate+ ln income per catpita + Year + State +time + clustered standard errors?

## model(4)

#( ln income )\*\*2 , ( ln income )\*\*3 추가  
model\_4\_new <- plm(frate ~ beertax + age18 + age19 + age20 + jaild + comserd + vmiles + unrate + lninc2 + lninc3 ,  
 data = fatality, index = c("state", "year"), model = "within", effect = "twoways")  
coeftest(model\_4\_new, vcov = vcovHC) #이분산성 고려

##   
## t test of coefficients:  
##   
## Estimate Std. Error t value Pr(>|t|)   
## beertax -2.3748e-01 2.2815e-01 -1.0409 0.2988   
## age18 3.5078e-03 6.5721e-02 0.0534 0.9575   
## age19 -1.1529e-02 4.1396e-02 -0.2785 0.7808   
## age20 1.5391e-02 4.5648e-02 0.3372 0.7363   
## jaild 8.0678e-03 1.6538e-02 0.4878 0.6261   
## comserd 6.9964e-02 9.5857e-02 0.7299 0.4661   
## vmiles 8.4875e-06 5.2569e-06 1.6145 0.1076   
## unrate -4.9793e-02 1.2191e-02 -4.0845 5.820e-05 \*\*\*  
## lninc2 2.8773e+00 5.6578e-01 5.0856 6.849e-07 \*\*\*  
## lninc3 -1.9162e-01 3.8630e-02 -4.9605 1.243e-06 \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

#95% CI for beertax  
b1 <- coeftest(model\_4\_new, vcov = vcovHC)[1,1]  
se.b1 <- coeftest(model\_4\_new, vcov = vcovHC)[1,2]  
L <- b1-1.96\*se.b1; U <- b1+1.96\*se.b1  
CIforBeertax<- c(L,U)  
CIforBeertax

## [1] -0.6846599 0.2096925

# 0 을 포함하고 있으므로 beertax 통계적으로 유의미하지 않다.

## model(6)

#( ln income )\*\*2 , ( ln income )\*\*3 추가  
model\_6\_new <- plm(frate ~ beertax + mlda + manOrcom + vmiles + unrate + lninc2 + lninc3 ,  
 data = fatality, index = c("state", "year"), model = "within", effect = "twoways")  
coeftest(model\_6\_new, vcov = vcovHC) #이분산성 고려

##   
## t test of coefficients:  
##   
## Estimate Std. Error t value Pr(>|t|)   
## beertax -2.3694e-01 2.3653e-01 -1.0017 0.31736   
## mlda 2.3139e-03 1.8262e-02 0.1267 0.89926   
## manOrcom 6.1832e-02 7.6175e-02 0.8117 0.41767   
## vmiles 8.9573e-06 5.3726e-06 1.6672 0.09661 .   
## unrate -4.9848e-02 1.2262e-02 -4.0652 6.275e-05 \*\*\*  
## lninc2 2.8966e+00 5.7974e-01 4.9964 1.042e-06 \*\*\*  
## lninc3 -1.9305e-01 3.9679e-02 -4.8652 1.931e-06 \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

#95% CI for beertax  
b1 <- coeftest(model\_6\_new, vcov = vcovHC)[1,1]  
se.b1<- coeftest(model\_6\_new, vcov = vcovHC)[1,2]  
L <- b1-1.96\*se.b1; U <- b1+1.96\*se.b1  
CIforBeertax<- c(L,U)  
CIforBeertax

## [1] -0.7005410 0.2266626

# 0 을 포함하고 있으므로 beertax 통계적으로 유의미하지 않다.