ReturnstoSchooling_IV_-_Mar28.R

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```
# Author: Gordon Burtch and Gautam Ray
# Course: MSBA 6440
# Session: Instrumental Variables
# Lecture 7

library(MASS)
library(stargazer)
```

```
##
## 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
```

```
library(AER)
```

```
## Warning: package 'AER' was built under R version 3.6.3

## Loading required package: car

## Warning: package 'car' was built under R version 3.6.3

## Loading required package: carData

## Loading required package: lmtest

## Warning: package 'lmtest' was built under R version 3.6.2

## Loading required package: zoo

## Warning: package 'zoo' was built under R version 3.6.2

##
## Attaching package: 'zoo'

## The following objects are masked from 'package:base':
##
##     as.Date, as.Date.numeric

## Loading required package: sandwich
```

```
## Warning: package 'sandwich' was built under R version 3.6.2

## Loading required package: survival

## Warning: package 'survival' was built under R version 3.6.3
```

```
MyData1<-read.csv("MROZ.csv")
MyData <- MyData1[MyData1$lfp==1,] #restricts sample to lfp=1

#OLS Model of Wage on Education

ols <- lm(log(wage)~educ+exper+expersq, data=MyData)

# 2SLS Model 'by hand'

educ.ols <- lm(educ~exper+expersq+motheduc, data=MyData)
educHat <- fitted(educ.ols)
wage.2sls <- lm(log(wage)~educHat+exper+expersq, data=MyData)

#IVREG

wage.ivreg <- ivreg(log(wage)~educ+exper+expersq|exper+expersq+motheduc, data=MyData)

stargazer(ols,wage.2sls,wage.ivreg,type="text",title="OLS vs 2SLS vs IVREG",column.labels = c("OLS","2SL
```

```
##
## OLS vs 2SLS vs IVREG
## ================================================================
##                                      Dependent variable:
##                                  -----------------------------
##                                           log(wage)
##                                        OLS         instrumental
##                                                      variable
##                                    OLS      2SLS      IVREG
##                                    (1)      (2)        (3)
## ----------------------------------------------------------------
## educ                              0.107***              0.049
##                                    (0.014)             (0.037)
##
## educHat                                     0.049
##                                            (0.039)
##
## exper                             0.042***  0.045***   0.045***
##                                    (0.013)  (0.014)    (0.014)
##
## expersq                           -0.001**  -0.001**   -0.001**
##                                   (0.0004)  (0.0004)   (0.0004)
##
## Constant                          -0.522***  0.198      0.198
##                                    (0.199)  (0.493)    (0.473)
##
## ----------------------------------------------------------------
## Observations                         428      428        428
```

```
## R2                             0.157    0.046      0.123
## Adjusted R2                    0.151    0.039      0.117
## Residual Std. Error (df = 424)   0.666    0.709      0.680
## F Statistic (df = 3; 424)      26.286*** 6.751***
## ============================================================
## Note:                            *p<0.1; **p<0.05; ***p<0.01
```

```
# Setting "diagnostics = TRUE" let's us assess a hausman test, weak IV stats and overidentifying tests
summary(wage.ivreg,diagnostics=TRUE)
```

```
##
## Call:
## ivreg(formula = log(wage) ~ educ + exper + expersq | exper +
##     expersq + motheduc, data = MyData)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -3.10804 -0.32633  0.06024  0.36772  2.34351
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.1981861  0.4728772   0.419  0.67535
## educ         0.0492630  0.0374360   1.316  0.18891
## exper        0.0448558  0.0135768   3.304  0.00103 **
## expersq     -0.0009221  0.0004064  -2.269  0.02377 *
##
## Diagnostic tests:
##                  df1 df2 statistic p-value
## Weak instruments   1 424    73.946  <2e-16 ***
## Wu-Hausman         1 423     2.968  0.0856 .
## Sargan             0  NA        NA      NA
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.6796 on 424 degrees of freedom
## Multiple R-Squared: 0.1231,  Adjusted R-squared: 0.1169
## Wald test: 7.348 on 3 and 424 DF,  p-value: 8.228e-05
```

```
wage.ivreg2 <- ivreg(log(wage)~educ+exper+expersq|exper+expersq+motheduc+fatheduc, data=MyData)
summary(wage.ivreg2,diagnostics=TRUE)
```

```
##
## Call:
## ivreg(formula = log(wage) ~ educ + exper + expersq | exper +
##     expersq + motheduc + fatheduc, data = MyData)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -3.0986 -0.3196  0.0551  0.3689  2.3493
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.0481003  0.4003281   0.120  0.90442
```

```
## educ         0.0613966  0.0314367   1.953  0.05147 .
## exper        0.0441704  0.0134325   3.288  0.00109 **
## expersq     -0.0008990  0.0004017  -2.238  0.02574 *
##
## Diagnostic tests:
##                  df1 df2 statistic p-value
## Weak instruments   2 423    55.400  <2e-16 ***
## Wu-Hausman         1 423     2.793  0.0954 .
## Sargan             1  NA     0.378  0.5386
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.6747 on 424 degrees of freedom
## Multiple R-Squared: 0.1357,  Adjusted R-squared: 0.1296
## Wald test: 8.141 on 3 and 424 DF,  p-value: 2.787e-05
```