

# Computing Assignment VII

*group*

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your document

```
rm(list = ls())          # clean the workspace
library(ggplot2)         # use read_dta
library(tidyverse)       # data cleaning packages
```

```
## -- Attaching packages -----
## v tibble  1.4.2      v purrr  0.2.4
## v tidyr   0.7.2      v dplyr  0.7.4
## v readr   1.1.1      v stringr 1.2.0
## v tibble  1.4.2      v forcats 0.2.0

## -- Conflicts ----- ti
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()     masks stats::lag()
```

```
library(broom)
library(lmtest)
```

```
## Loading required package: zoo
```

```
##
```

```
## Attaching package: 'zoo'
```

```
## The following objects are masked from 'package:base':
```

```
##
```

```
##      as.Date, as.Date.numeric
```

```
library(MASS)
```

```
##
```

```
## Attaching package: 'MASS'
```

```
## The following object is masked from 'package:dplyr':
```

```
##
```

```
##      select
```

```
library(dplyr)
library(AER)
```

```
## Loading required package: car
```

```
##
```

```
## Attaching package: 'car'
```

```
## The following object is masked from 'package:dplyr':
```

```
##
```

```
##      recode
```

```
## The following object is masked from 'package:purrr':
```

```
##
```

```
##      some
```

```
## Loading required package: sandwich
## Loading required package: survival
```

## load data

```
data0 <- read.csv("C:/Users/Manho/Documents/UCDavis/Econ/18_Winter/240A/HW/hw7/RSdata.csv")
data <- data.frame(sapply(data0, function(x) as.numeric(as.character(x))))

## Warning in FUN(X[[i]], ...): NAs introduced by coercion
## Warning in FUN(X[[i]], ...): NAs introduced by coercion
## Warning in FUN(X[[i]], ...): NAs introduced by coercion
## Warning in FUN(X[[i]], ...): NAs introduced by coercion
## Warning in FUN(X[[i]], ...): NAs introduced by coercion
## Warning in FUN(X[[i]], ...): NAs introduced by coercion
## Warning in FUN(X[[i]], ...): NAs introduced by coercion
## Warning in FUN(X[[i]], ...): NAs introduced by coercion
data <- data %>% mutate(lag_ln_w = dplyr::lag(ln_w))
```

## run OLS

```
# OLS supply w/o ln_w
reg_s <- lm(ln_qs ~ ln_fp + trendsp1+trendsp2+trendsp3, data=data)
b_ols<-coefest(reg_s)[,1]%>%
  as.matrix()

# OLS supply w/ ln_w
reg_s_w <- lm(ln_qs ~ ln_fp + ln_w + trendsp1+trendsp2+trendsp3, data=data)
b_ols_w<-coefest(reg_s_w)[,1] %>%
  as.matrix()

# OLS demand
reg_d <- lm(ln_qd ~ ln_sp + trendsp1+trendsp2+trendsp3, data=data)
b_ols_d<-coefest(reg_d)[,1] %>%
  as.matrix()

## run IV reg

# IV w/o ln_w
reg_s_iv <-ivreg(ln_qs ~ ln_fp + trendsp1+trendsp2+trendsp3, ~lag_ln_w + trendsp1+trendsp2+trendsp3, da
coefest(reg_s_iv)

##
## t test of coefficients:
```

```
##
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept) -69.4899096   3.9925273 -17.4050 < 2e-16 ***
## ln_fp        0.0598294   0.0520093   1.1504 0.25569
## trendsp1     0.0392843   0.0020617  19.0547 < 2e-16 ***
## trendsp2    -0.0301243   0.0112554  -2.6764 0.01015 *
## trendsp3     0.0610156   0.0321570   1.8974 0.06380 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

b_iv<-coeftest(reg_s_iv)[,1] %>%
  as.matrix()

# IV w ln_w
reg_s_iv_w <-ivreg(ln_qs ~ ln_fp + ln_w + trendsp1+trendsp2+trendsp3, ~lag_ln_w + ln_w+trendsp1+trendsp2+trendsp3)
coeftest(reg_s_iv_w)

##
## t test of coefficients:
##
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept) -62.3715258   2.0567150 -30.3258 < 2.2e-16 ***
## ln_fp        0.1016518   0.0251466   4.0424 0.0001949 ***
## ln_w         1.2909624   0.1059657  12.1828 3.776e-16 ***
## trendsp1     0.0356272   0.0010627  33.5243 < 2.2e-16 ***
## trendsp2    -0.0129334   0.0058001  -2.2299 0.0305720 *
## trendsp3     0.0131400   0.0165279   0.7950 0.4305995
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

b_iv_w<-coeftest(reg_s_iv_w)[,1] %>%
  as.matrix()

reg_d_iv <-ivreg(ln_qd ~ ln_sp + trendsp1+trendsp2+trendsp3, ~ln_w+trendsp1+trendsp2+trendsp3, data)
coeftest(reg_d_iv)

##
## t test of coefficients:
##
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept) -71.7698078   1.7847861 -40.2120 < 2.2e-16 ***
## ln_sp        -0.0632913   0.0228220  -2.7733 0.00788 **
## trendsp1     0.0405538   0.0009175  44.2003 < 2.2e-16 ***
## trendsp2    -0.0468272   0.0050383  -9.2943 2.629e-12 ***
## trendsp3     0.1108452   0.0148306   7.4741 1.385e-09 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

## Hausman test

```
H <- t(b_iv-b_ols)%*%solve(vcov(reg_s_iv)-vcov(reg_s))%*%(b_iv-b_ols)
H_w <- t(b_iv_w-b_ols_w)%*%solve(vcov(reg_s_iv_w)-vcov(reg_s_w))%*%(b_iv_w-b_ols_w)
```

```
pchisq(H,df=5)
```

```
##           [,1]  
## [1,] 0.002153352
```

```
pchisq(H_w,df=5)
```

```
##           [,1]  
## [1,] 0.179355
```

## supply elasticity for area, yield

```
reg_s_ay <- lm(ln_qs ~ log(area) + log(yield_shock), data=data)  
coeftest(reg_s_ay)
```

```
##  
## t test of coefficients:  
##  
##           Estimate Std. Error  t value Pr(>|t|)  
## (Intercept)   -15.398910    0.687408  -22.4014   <2e-16 ***  
## log(area)       3.774865    0.108788   34.6994   <2e-16 ***  
## log(yield_shock) 0.082331    0.488641    0.1685    0.8669  
## ---  
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```