Lab 14

AML

10/11/2020

Setup

```
setwd("/Users/andrea/Desktop/UEA/Classes/Econometrics/Data")
load("fastfood3.RData")
load("fastfood4.RData")
load("fastfood.RData")
library(ggplot2)
library(data.table)
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
```

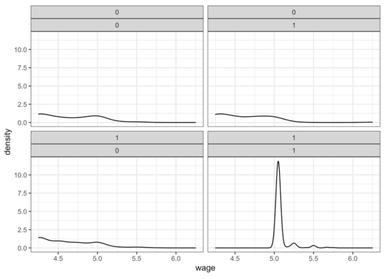
See the data

```
head(dt.fastfood)
```

```
##    emptot gap    demp state chain co_owned atmin meals wage hrsopen pmeal
## 1:  40.50   0 -16.50     0     1        0    NA     2   NA    16.5  2.58
## 2:  13.75   0  -2.25     0     2        0    NA     2   NA    13.0  4.26
## 3:   8.50   0   2.00     0     2        1    NA     2   NA    10.0  4.02
## 4:  34.00   0 -14.00     0     4        1     0     2  5.0    12.0  3.48
## 5:  24.00   0  11.50     0     4        1     0     3  5.5    12.0  3.29
## 6:  20.50   0     NA     0     4        1     0     2  5.0    12.0  2.59
##       fracft time id
## 1: 0.7407407    0  1
## 2: 0.4727273    0  2
## 3: 0.3529412    0  3
## 4: 0.5882353    0  4
## 5: 0.2500000    0  5
## 6: 0.0000000    0  6
```

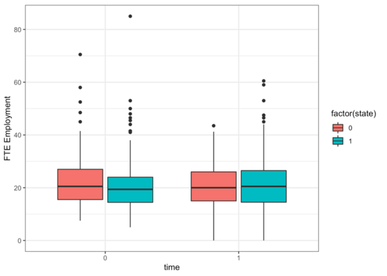
```
plot1 <- ggplot( data = dt.fastfood, aes(x = wage))
plot1 + geom_density() + facet_wrap( ~ state + time) + theme_bw()
```

```
## Warning: Removed 37 rows containing non-finite values (stat_density).
```




```
qplot(data = dt.fastfood, x = factor(time), y = emptot
, fill = factor(state)
, geom = "boxplot") + theme_bw() + xlab("time") + ylab("FTE Employment")
```

```
## Warning: Removed 21 rows containing non-finite values (stat_boxplot).
```



Variables means

```
dt.bf.aft <- data.table(dt.fastfood) # Create a new table called dt.bf.aft
dt.bf.aft <- dt.bf.aft[, list( # Create a list of the columns of your new table
mean_emptot = mean(emptot , na.rm=TRUE)
, mean_wage = mean(wage , na.rm=TRUE)
, mean_pmeal = mean(pmeal , na.rm=TRUE)
, mean_hrsopen = mean(hrsopen , na.rm=TRUE)), by=list(state, time)] # Specifiy the list of grouping variables
dt.bf.aft
```

```
##    state time mean_emptot mean_wage mean_pmeal mean_hrsopen
## 1:     0    0    23.33117  4.630132   3.042368     14.52532
## 2:     1    0    20.44557  4.610971   3.356471     14.42025
## 3:     0    1    21.16558  4.617465   3.026620     14.65385
## 4:     1    1    21.02743  5.080947   3.416809     14.41484
```

Create table using clean data

```
dt.bf.aft.clean <- dt.fastfood[!is.na(wage),]
dt.bf.aft.clean <- dt.bf.aft.clean[!is.na(pmeal),]
dt.bf.aft.clean <- dt.bf.aft.clean[!is.na(emptot),]
dt.bf.aft.clean <- dt.bf.aft.clean[!is.na(hrsopen),]
dt.bf.aft.clean <- dt.bf.aft.clean[!is.na(emptot),]
dt.bf.aft.clean <- data.table(dt.fastfood.clean)
dt.bf.aft.clean <- dt.bf.aft.clean[, list(
  mean_emptot = mean(emptot , na.rm=TRUE)
, mean_wage = mean(wage , na.rm=TRUE)
, mean_pmeal = mean(pmeal , na.rm=TRUE)
, mean_hrsopen = mean(hrsopen , na.rm=TRUE)), by=list(state, time)]
dt.bf.aft.clean
```

```
##    state time mean_emptot mean_wage mean_pmeal mean_hrsopen
## 1:     0    0    23.62687  4.651343   3.054062     14.57463
## 2:     1    0    20.51397  4.609655   3.377033     14.41207
## 3:     0    1    21.50000  4.618788   3.006406     14.72727
## 4:     1    1    20.71293  5.082141   3.451808     14.40053
```

Difference in FTE employment between NJ and PA at T0

```
t.test(dt.fastfood.clean[state==0 & time==0, emptot], dt.fastfood.clean[state==1 & time==0, emptot])
```

```
##
##  Welch Two Sample t-test
##
## data:  dt.fastfood.clean[state == 0 & time == 0, emptot] and dt.fastfood.clean[state == 1 & time == 0, emptot]
## t = 1.9515, df = 84.174, p-value = 0.05432
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -0.05909098  6.28489129
## sample estimates:
## mean of x mean of y
##  23.62687  20.51397
```

Difference in FTE employment between NJ and PA at T1

```
t.test(dt.fastfood.clean[state==0 & time==1, emptot], dt.fastfood.clean[state==1 & time==1, emptot])
```

```
##
##  Welch Two Sample t-test
##
## data:  dt.fastfood.clean[state == 0 & time == 1, emptot] and dt.fastfood.clean[state == 1 & time == 1, emptot]
## t = 0.66779, df = 103.74, p-value = 0.5058
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -1.550250  3.124388
## sample estimates:
## mean of x mean of y
##  21.50000  20.71293
```

Difference in Differences

```
#Using all data
(21.02743-20.44557) - (21.16558-23.33117)
```

```
## [1] 2.74745
```

```
#Clean data (balanced subsample)
(20.71293-20.51397) - (21.50000-23.62687)
```

```
## [1] 2.32583
```

Regressions

```
lm1 <- lm( emptot ~ time + state + time*state, data = dt.fastfood.clean)
stargazer(lm1, type = "text")
```

```
##
## ===================================================
##                             Dependent variable:
##                         ------------------------
##                                    emptot
## ---------------------------------------------------
## time                                -2.127
##                                     (1.639)
##
## state                              -3.113**
##                                     (1.286)
##
## time:state                           2.326
##                                     (1.818)
##
## Constant                           23.627***
##                                     (1.159)
##
## ---------------------------------------------------
## Observations                          714
## R2                                   0.009
## Adjusted R2                          0.005
## Residual Std. Error       9.486 (df = 710)
## F Statistic             2.116* (df = 3; 710)
## ===================================================
## Note:                   *p<0.1; **p<0.05; ***p<0.01
```

```
coeffs <- coefficients(lm1)
coeffs
```

```
## (Intercept)        time       state  time:state
##   23.626866   -2.126866   -3.112900    2.325831
```

How do we interpret the regression coefficients?
emptot00: average FTE employment at T1 in PA (beta 0)
emptot01: average FTE employment at T1 in NJ (beat 0 + beta 2)
emptot10: average FTE employment at T2 in PA (beta 0 + beta 1)
emptot11: average FTE employment at T2 in PA (beta 0 + beta 1 + beta 2 + beta 3)