Question A

Harvard EcLabs

2023-04-06

Packages

```
library(estimatr)
library(modelsummary)
library(ggplot2)
```

Reading in Data

```
dat <- read.csv('agg_cbp_single.csv')
dat_TOTALEMP <- dat[which(dat$naics == '------'),]
dat_WHEMP <- dat[which(dat$naics == '493///'),]
```

Variable Creation

```
dat_WHEMP$EMP_RAT <- dat_WHEMP$emp/dat_WHEMP$CT_POP
dat_WHEMP$TOT_EMP_RAT <- dat_WHEMP$TOT_EMP/dat_WHEMP$CT_POP
dat_WHEMP$WH_RAT <- dat_WHEMP$emp/dat_WHEMP$TOT_EMP
dat_TOTALEMP$CT_RAT <- dat_TOTALEMP$emp/dat_TOTALEMP$CT_POP
```

Regressions Models

```
lm1 <- lm_robust(EMP_RAT ~ TREAT, data = dat_WHEMP[which(dat_WHEMP$emp > 0),])
lm2 <- lm_robust(WH_RAT ~ TREAT, data = dat_WHEMP[which(dat_WHEMP$emp > 0),])
lm3 <- lm_robust(CT_RAT ~ TREAT, data = dat_TOTALEMP)
```

Summary Warehouse Employment to County Ratio

```
summary(lm1)
```

```
##
## Call:
## lm_robust(formula = EMP_RAT ~ TREAT, data = dat_WHEMP[which(dat_WHEMP$emp >
##     0), ])
##
## Standard error type:  HC2
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)   CI Lower CI Upper DF
## (Intercept) 0.005401   0.001704   3.170 0.002383  0.0019941 0.008807 61
## TREAT       0.005635   0.002871   1.962 0.054296 -0.0001072 0.011377 61
##
## Multiple R-squared:  0.0529 ,    Adjusted R-squared:  0.03738
## F-statistic: 3.851 on 1 and 61 DF,  p-value: 0.0543
```

Summary Warehouse Employment to Total Employment Ratio

```
summary(lm2)
```

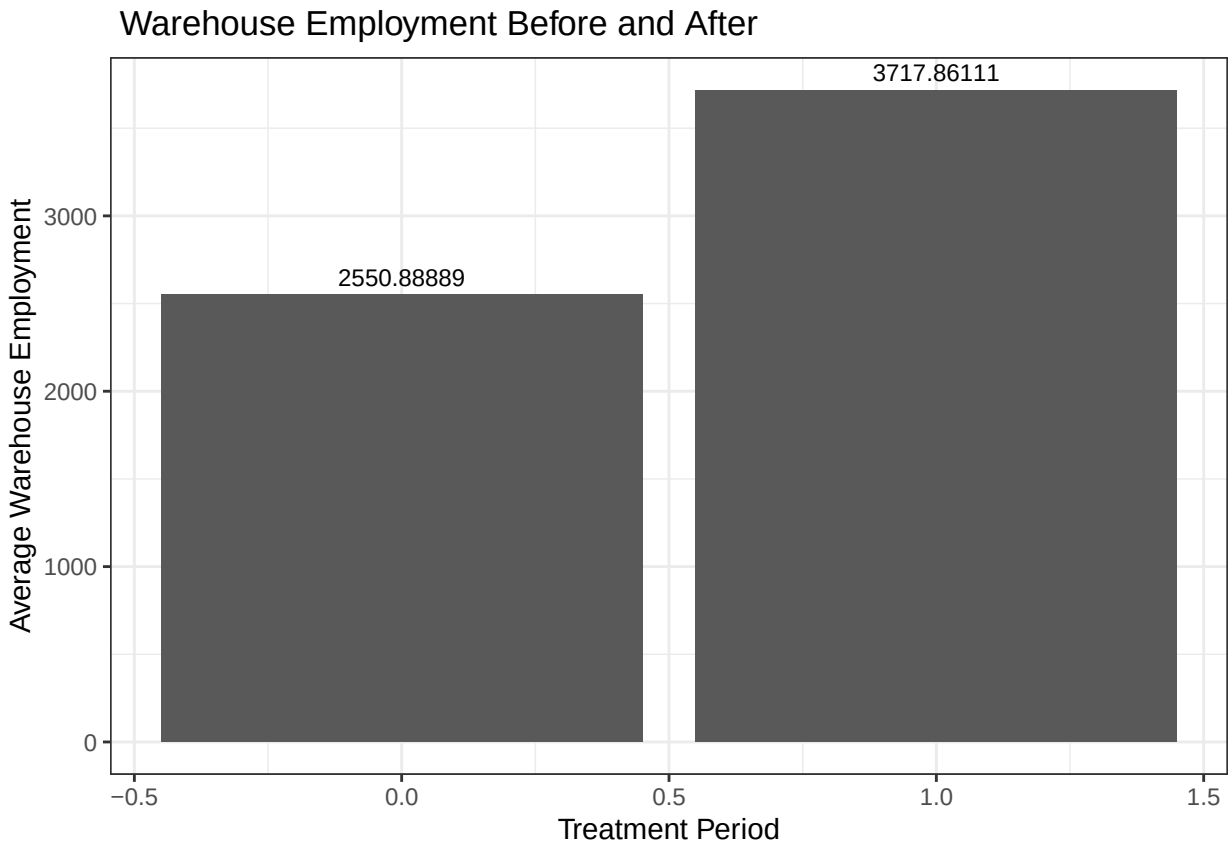
```
##
## Call:
## lm_robust(formula = WH_RAT ~ TREAT, data = dat_WHEMP[which(dat_WHEMP$emp >
##     0), ])
##
## Standard error type:  HC2
##
## Coefficients:
##             Estimate Std. Error t value  Pr(>|t|) CI Lower CI Upper DF
## (Intercept)  0.01451   0.003257   4.456 3.638e-05 0.008000  0.02102 61
## TREAT        0.01881   0.008630   2.179 3.319e-02 0.001549  0.03606 61
##
## Multiple R-squared:  0.05844 ,   Adjusted R-squared:  0.043
## F-statistic: 4.749 on 1 and 61 DF,  p-value: 0.03319
```

Summary Total Employment to County Ratio

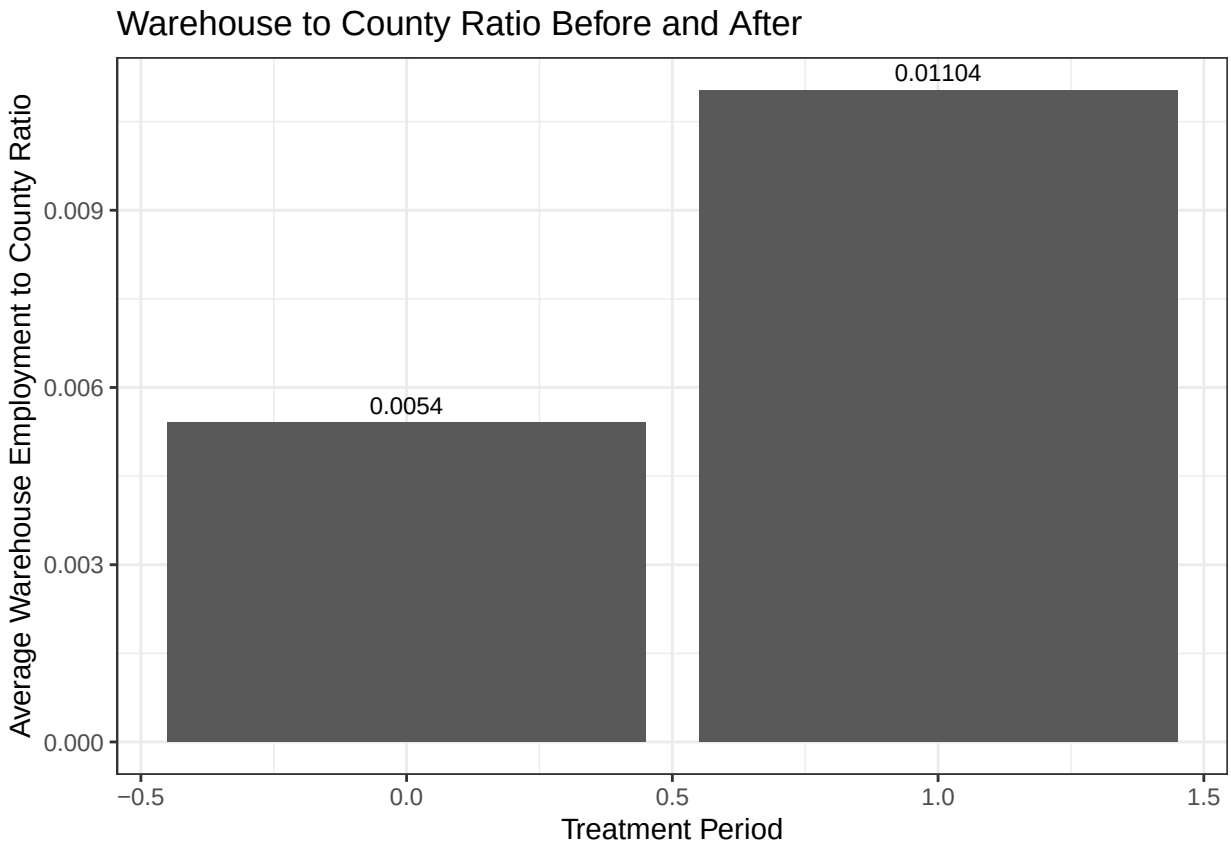
```
summary(lm3)
```

```
##
## Call:
## lm_robust(formula = CT_RAT ~ TREAT, data = dat_TOTALEMP)
##
## Standard error type:  HC2
##
## Coefficients:
##             Estimate Std. Error t value  Pr(>|t|) CI Lower CI Upper DF
## (Intercept)  0.36149    0.01870 19.3331 1.193e-30  0.32424  0.39875 74
## TREAT        0.02242    0.02631  0.8524 3.967e-01 -0.02999  0.07484 74
##
## Multiple R-squared:  0.009724 ,  Adjusted R-squared:  -0.003658
## F-statistic: 0.7266 on 1 and 74 DF,  p-value: 0.3967
```

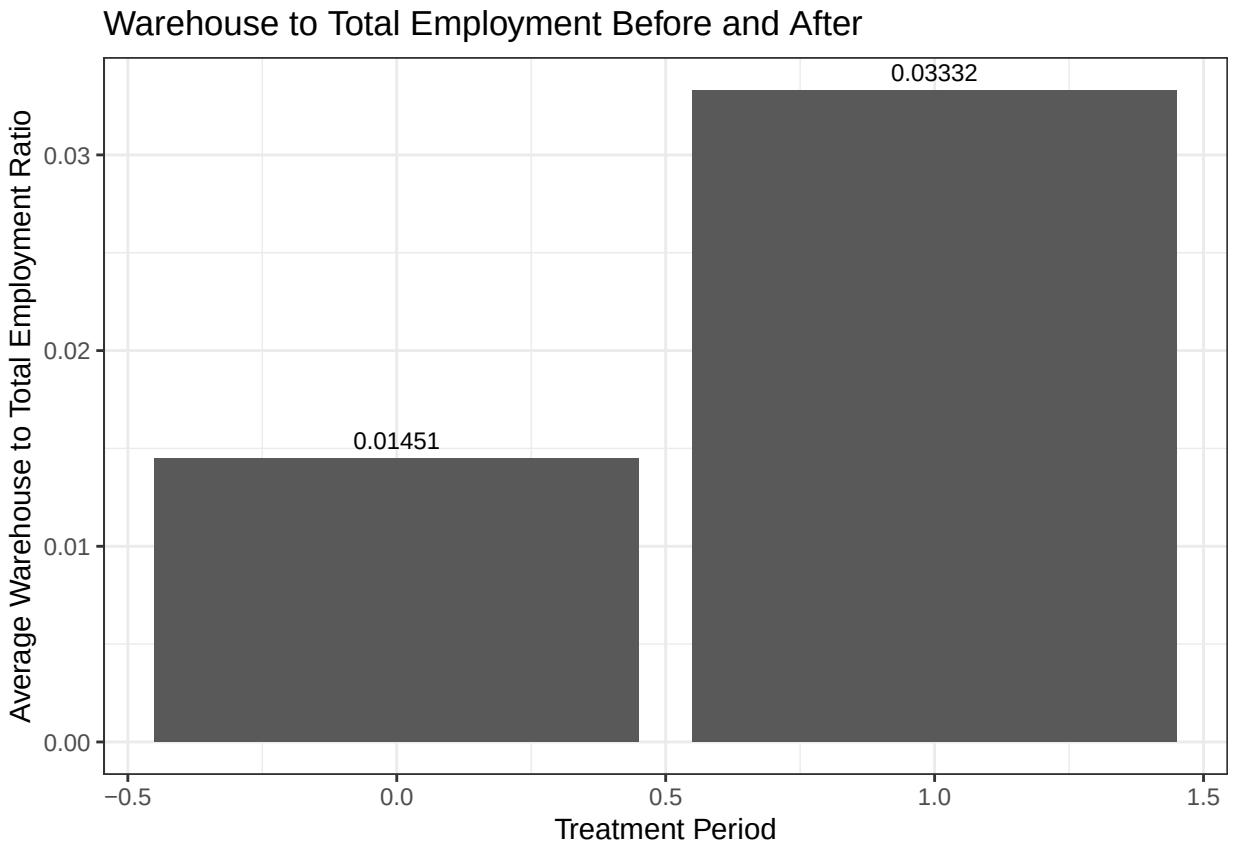
```
ggplot(dat_WHEMP[which(dat_WHEMP$emp > 0),], aes(x = TREAT, y = emp)) +
  geom_bar(position = "dodge", stat = "summary", fun = "mean") +
  stat_summary(aes(label=round(after_stat(y), 5)), fun = 'mean', geom ="text", size = 3,
               vjust = -0.5) +
  xlab('Treatment Period') + ylab('Average Warehouse Employment') +
  ggtitle(' Warehouse Employment Before and After') + theme_bw()
```



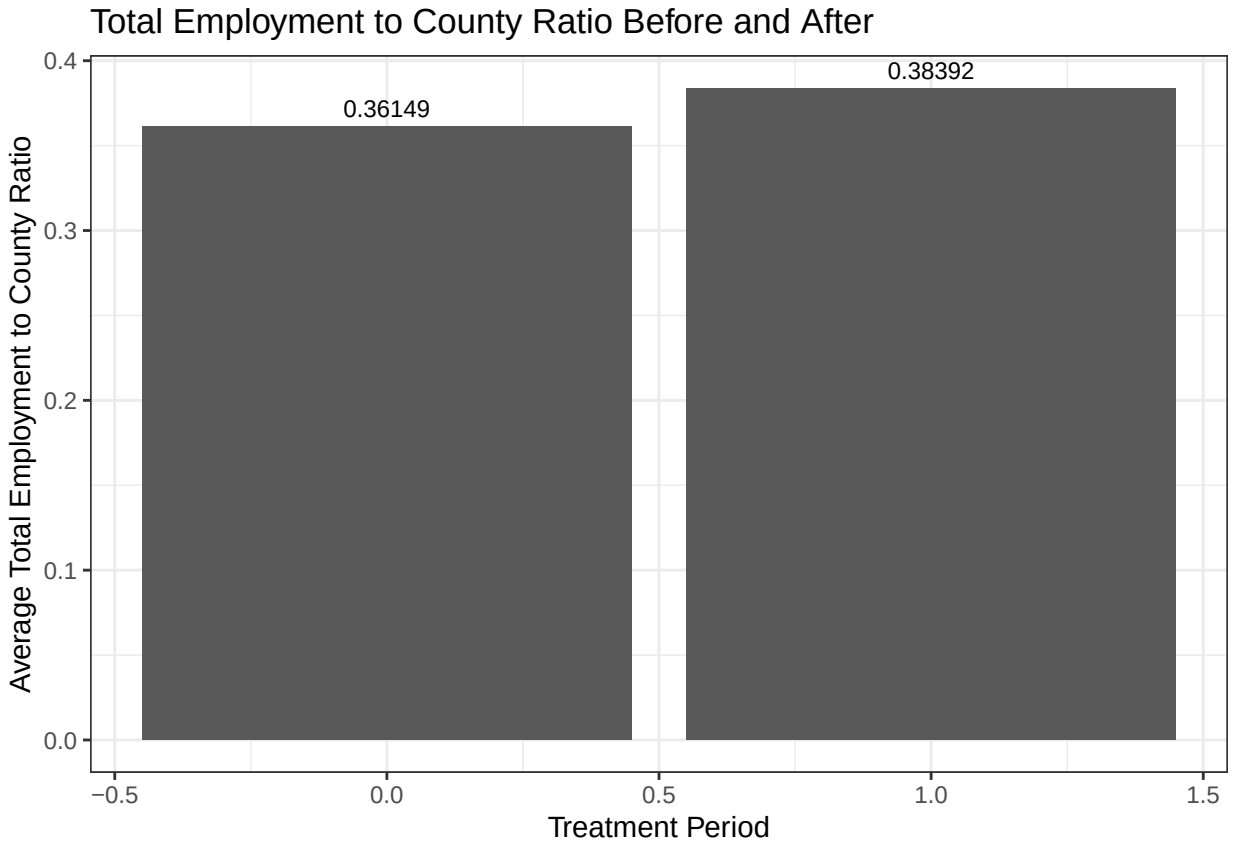

```
ggplot(dat_WHEMP[which(dat_WHEMP$emp > 0),], aes(x = TREAT, y = EMP_RAT)) +
  geom_bar(position = "dodge", stat = "summary", fun = "mean") +
  stat_summary(aes(label=round(after_stat(y), 5)), fun = 'mean', geom ="text", size = 3,
               vjust = -0.5) +
  xlab('Treatment Period') + ylab('Average Warehouse Employment to County Ratio') +
  ggtitle('Warehouse to County Ratio Before and After') + theme_bw()
```




```
ggplot(dat_WHEMP[which(dat_WHEMP$emp > 0),], aes(x = TREAT, y = WH_RAT)) +
  geom_bar(position = "dodge", stat = "summary", fun = "mean") +
  stat_summary(aes(label=round(after_stat(y), 5)), fun = 'mean', geom ="text", size = 3,
               vjust = -0.5) +
  xlab('Treatment Period') + ylab('Average Warehouse to Total Employment Ratio') +
  ggtitle('Warehouse to Total Employment Before and After') + theme_bw()
```




```
ggplot(dat_TOTALEMP, aes(x = TREAT, y = CT_RAT)) +
  geom_bar(position = "dodge", stat = "summary", fun = "mean") +
  stat_summary(aes(label=round(after_stat(y), 5)), fun = 'mean', geom ="text", size = 3,
               vjust = -0.5) +
  xlab('Treatment Period') + ylab('Average Total Employment to County Ratio') +
  ggtitle('Total Employment to County Ratio Before and After') + theme_bw()
```


Total Employment to County Ratio Before and After
Average Total Employment to County Ratio
0.4
0.3
0.2
0.1
0.0
0.36149
0.38392
−0.5
0.0
0.5
1.0
1.5
Treatment Period