

R Notebook

```
library(tidyverse)
```

```
## -- Attaching packages ----- tidyverse 1.3.1 --
```

```
## v ggplot2 3.3.5      v purrr  0.3.4
## v tibble  3.1.6      v dplyr  1.0.7
## v tidyr   1.1.4      v stringr 1.4.0
## v readr   2.1.0      v forcats 0.5.1
```

```
## -- Conflicts ----- tidyverse_conflicts() --
```

```
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
library(haven)
iv_dataset2 <- read_dta("iv_dataset2.dta")
dt2_assigned <- iv_dataset2$supplement_assigned
dt2_treated <- iv_dataset2$supplement_received
lm(iv_dataset2$performance~dt2_assigned)
```

```
##
## Call:
## lm(formula = iv_dataset2$performance ~ dt2_assigned)
##
## Coefficients:
## (Intercept) dt2_assigned
##      66.42      13.08
```

```
library(AER)
```

```
## Lade nötiges Paket: car
```

```
## Lade nötiges Paket: carData
```

```
##
## Attache Paket: 'car'
```

```
## Das folgende Objekt ist maskiert 'package:dplyr':
##
##      recode
```

```
## Das folgende Objekt ist maskiert 'package:purrr':
##
##      some
```

```
## Lade nötiges Paket: lmtest

## Lade nötiges Paket: zoo

##
## Attache Paket: 'zoo'

## Die folgenden Objekte sind maskiert von 'package:base':
##
##      as.Date, as.Date.numeric

## Lade nötiges Paket: sandwich

## Lade nötiges Paket: survival

summary(ivreg(iv_dataset2$performance~dt2_treated | dt2_assigned))

##
## Call:
## ivreg(formula = iv_dataset2$performance ~ dt2_treated | dt2_assigned)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -27.0126  -6.3590   0.1957   6.7685  27.1237
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  66.4203     0.8906   74.58  <2e-16 ***
## dt2_treated  16.0290     1.5435   10.38  <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 9.957 on 248 degrees of freedom
## Multiple R-Squared: 0.4097, Adjusted R-squared: 0.4073
## Wald test: 107.8 on 1 and 248 DF, p-value: < 2.2e-16
```

The local average treatment effect indicates the average effect on those encouraged to take treatment through randomized encouragement, i.e. the complying individuals. ATE is identical to LATE if compliance of subjects is representative of all individuals: whether students who took the nutritional supplement after being selected into the treatment group are representative of the rest of the students. In this case, we could assume homogenous effects and generalize the LATE to the whole treatment group, meaning, the LATE would be equivalent to the ATE.

```
summary(lm(dt2_treated~dt2_assigned))

##
## Call:
## lm(formula = dt2_treated ~ dt2_assigned)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
```

```
## -0.816 0.000 0.000 0.184 0.184
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) -1.292e-15  2.461e-02   0.00      1
## dt2_assigned  8.160e-01  3.480e-02  23.45 <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.2751 on 248 degrees of freedom
## Multiple R-squared:  0.6892, Adjusted R-squared:  0.6879
## F-statistic: 549.9 on 1 and 248 DF,  p-value: < 2.2e-16
```

```
predict(lm(dt2_treated~dt2_assigned))
```

```
##           1           2           3           4           5
## 8.160000e-01 -1.291987e-15 8.160000e-01 8.160000e-01 8.160000e-01
##           6           7           8           9          10
## -1.291987e-15 -1.291987e-15 8.160000e-01 8.160000e-01 -1.291987e-15
##          11          12          13          14          15
## 8.160000e-01 -1.291987e-15 8.160000e-01 8.160000e-01 -1.291987e-15
##          16          17          18          19          20
## 8.160000e-01 -1.291987e-15 -1.291987e-15 -1.291987e-15 8.160000e-01
##          21          22          23          24          25
## -1.291987e-15 -1.291987e-15 8.160000e-01 8.160000e-01 -1.291987e-15
##          26          27          28          29          30
## -1.291987e-15 -1.291987e-15 -1.291987e-15 -1.291987e-15 -1.291987e-15
##          31          32          33          34          35
## -1.291987e-15 8.160000e-01 -1.291987e-15 -1.291987e-15 8.160000e-01
##          36          37          38          39          40
## 8.160000e-01 8.160000e-01 -1.291987e-15 -1.291987e-15 -1.291987e-15
##          41          42          43          44          45
## -1.291987e-15 8.160000e-01 -1.291987e-15 -1.291987e-15 8.160000e-01
##          46          47          48          49          50
## -1.291987e-15 8.160000e-01 -1.291987e-15 8.160000e-01 8.160000e-01
##          51          52          53          54          55
## 8.160000e-01 -1.291987e-15 8.160000e-01 8.160000e-01 -1.291987e-15
##          56          57          58          59          60
## 8.160000e-01 -1.291987e-15 -1.291987e-15 8.160000e-01 -1.291987e-15
##          61          62          63          64          65
## -1.291987e-15 -1.291987e-15 -1.291987e-15 8.160000e-01 -1.291987e-15
##          66          67          68          69          70
## -1.291987e-15 -1.291987e-15 8.160000e-01 8.160000e-01 -1.291987e-15
##          71          72          73          74          75
## -1.291987e-15 8.160000e-01 -1.291987e-15 8.160000e-01 8.160000e-01
##          76          77          78          79          80
## 8.160000e-01 -1.291987e-15 -1.291987e-15 8.160000e-01 -1.291987e-15
##          81          82          83          84          85
## -1.291987e-15 8.160000e-01 8.160000e-01 8.160000e-01 8.160000e-01
##          86          87          88          89          90
## -1.291987e-15 8.160000e-01 -1.291987e-15 8.160000e-01 8.160000e-01
##          91          92          93          94          95
## -1.291987e-15 8.160000e-01 -1.291987e-15 8.160000e-01 8.160000e-01
##          96          97          98          99         100
```

##	8.160000e-01	8.160000e-01	8.160000e-01	-1.291987e-15	8.160000e-01
##	101	102	103	104	105
##	-1.291987e-15	-1.291987e-15	-1.291987e-15	8.160000e-01	8.160000e-01
##	106	107	108	109	110
##	-1.291987e-15	-1.291987e-15	-1.291987e-15	-1.291987e-15	-1.291987e-15
##	111	112	113	114	115
##	-1.291987e-15	-1.291987e-15	8.160000e-01	-1.291987e-15	-1.291987e-15
##	116	117	118	119	120
##	8.160000e-01	-1.291987e-15	8.160000e-01	8.160000e-01	-1.291987e-15
##	121	122	123	124	125
##	-1.291987e-15	-1.291987e-15	-1.291987e-15	8.160000e-01	-1.291987e-15
##	126	127	128	129	130
##	-1.291987e-15	-1.291987e-15	-1.291987e-15	-1.291987e-15	8.160000e-01
##	131	132	133	134	135
##	8.160000e-01	-1.291987e-15	8.160000e-01	-1.291987e-15	8.160000e-01
##	136	137	138	139	140
##	8.160000e-01	8.160000e-01	-1.291987e-15	8.160000e-01	-1.291987e-15
##	141	142	143	144	145
##	8.160000e-01	8.160000e-01	8.160000e-01	-1.291987e-15	8.160000e-01
##	146	147	148	149	150
##	8.160000e-01	8.160000e-01	8.160000e-01	-1.291987e-15	-1.291987e-15
##	151	152	153	154	155
##	8.160000e-01	-1.291987e-15	-1.291987e-15	-1.291987e-15	8.160000e-01
##	156	157	158	159	160
##	8.160000e-01	8.160000e-01	8.160000e-01	8.160000e-01	8.160000e-01
##	161	162	163	164	165
##	-1.291987e-15	8.160000e-01	-1.291987e-15	-1.291987e-15	8.160000e-01
##	166	167	168	169	170
##	8.160000e-01	8.160000e-01	8.160000e-01	-1.291987e-15	-1.291987e-15
##	171	172	173	174	175
##	8.160000e-01	-1.291987e-15	8.160000e-01	8.160000e-01	8.160000e-01
##	176	177	178	179	180
##	8.160000e-01	-1.291987e-15	-1.291987e-15	-1.291987e-15	-1.291987e-15
##	181	182	183	184	185
##	8.160000e-01	-1.291987e-15	8.160000e-01	-1.291987e-15	8.160000e-01
##	186	187	188	189	190
##	-1.291987e-15	-1.291987e-15	8.160000e-01	-1.291987e-15	-1.291987e-15
##	191	192	193	194	195
##	8.160000e-01	-1.291987e-15	-1.291987e-15	8.160000e-01	-1.291987e-15
##	196	197	198	199	200
##	8.160000e-01	-1.291987e-15	8.160000e-01	8.160000e-01	8.160000e-01
##	201	202	203	204	205
##	8.160000e-01	8.160000e-01	-1.291987e-15	8.160000e-01	8.160000e-01
##	206	207	208	209	210
##	8.160000e-01	-1.291987e-15	-1.291987e-15	8.160000e-01	-1.291987e-15
##	211	212	213	214	215
##	-1.291987e-15	8.160000e-01	8.160000e-01	8.160000e-01	-1.291987e-15
##	216	217	218	219	220
##	8.160000e-01	-1.291987e-15	8.160000e-01	-1.291987e-15	-1.291987e-15
##	221	222	223	224	225
##	8.160000e-01	-1.291987e-15	8.160000e-01	8.160000e-01	-1.291987e-15
##	226	227	228	229	230
##	8.160000e-01	8.160000e-01	-1.291987e-15	-1.291987e-15	-1.291987e-15
##	231	232	233	234	235

```
## 8.160000e-01 8.160000e-01 -1.291987e-15 -1.291987e-15 8.160000e-01
##          236          237          238          239          240
## 8.160000e-01 -1.291987e-15 -1.291987e-15 8.160000e-01 8.160000e-01
##          241          242          243          244          245
## -1.291987e-15 -1.291987e-15 8.160000e-01 8.160000e-01 -1.291987e-15
##          246          247          248          249          250
## 8.160000e-01 8.160000e-01 8.160000e-01 8.160000e-01 -1.291987e-15
```

```
lm(iv_dataset2$performance ~ predict(lm(dt2_treated~dt2_assigned)))
```

```
##
## Call:
## lm(formula = iv_dataset2$performance ~ predict(lm(dt2_treated ~
##          dt2_assigned)))
##
## Coefficients:
##                                (Intercept)
##                                66.42
## predict(lm(dt2_treated ~ dt2_assigned))
##                                16.03
```