r\_test

knitr::opts\_chunk$set(echo = TRUE)  
  
#Loading appropriate libraries   
library(tidyverse) # Install stringr package

## ── Attaching packages ─────────────────────────────────────── tidyverse 1.3.1 ──

## ✓ ggplot2 3.3.5 ✓ purrr 0.3.4  
## ✓ tibble 3.1.6 ✓ dplyr 1.0.7  
## ✓ tidyr 1.1.4 ✓ stringr 1.4.0  
## ✓ readr 2.1.1 ✓ forcats 0.5.1

## ── Conflicts ────────────────────────────────────────── tidyverse\_conflicts() ──  
## x dplyr::filter() masks stats::filter()  
## x dplyr::lag() masks stats::lag()

library("stringr")   
  
  
#1.2 Importing the two raw datasets   
  
data\_jpal\_student <- read.csv("/Users/bhargavithakur/Desktop/r\_test\_j\_pal/student\_data.csv")  
  
data\_jpal\_school <- read.csv("/Users/bhargavithakur/Desktop/r\_test\_j\_pal/school\_data.csv")  
  
#summarizing data to find characterstics of raw data to check for any preliminary errors in the data   
  
summary(data\_jpal\_school)

## schid region\_district samp   
## Min. :101.0 Length:134 Length:134   
## 1st Qu.:134.2 Class :character Class :character   
## Median :167.5 Mode :character Mode :character   
## Mean :200.8   
## 3rd Qu.:301.8   
## Max. :335.0

summary(data\_jpal\_student)

## schid survdd survmo survyy survhhst   
## Min. :101 Min. : 0.00 Min. : 1.000 Min. : 10 Min. : 0.00   
## 1st Qu.:133 1st Qu.: 8.00 1st Qu.:10.000 1st Qu.:2010 1st Qu.: 9.00   
## Median :168 Median :15.00 Median :10.000 Median :2010 Median :10.00   
## Mean :201 Mean :16.55 Mean : 9.821 Mean :2010 Mean :10.33   
## 3rd Qu.:302 3rd Qu.:26.00 3rd Qu.:10.000 3rd Qu.:2010 3rd Qu.:12.00   
## Max. :336 Max. :31.00 Max. :50.000 Max. :2010 Max. :23.00   
## NA's :19 NA's :20 NA's :16   
## survminst gender saveamt end\_saveamt   
## Min. : 0.00 Length:5285 Min. :-999.0000 Min. :-999.000   
## 1st Qu.:11.00 Class :character 1st Qu.: 0.0000 1st Qu.: 0.000   
## Median :28.00 Mode :character Median : 0.0000 Median : 7.000   
## Mean :27.44 Mean : -0.4536 Mean : -1.161   
## 3rd Qu.:42.00 3rd Qu.: 4.0000 3rd Qu.: 13.000   
## Max. :71.00 Max. :1000.0000 Max. :1003.000   
## NA's :16   
## saving\_attitude\_index end\_saving\_attitude\_index student\_number\_school  
## Min. :-999.0000 Min. :-34062.96 Min. : 1.00   
## 1st Qu.: -0.6069 1st Qu.: -0.49 1st Qu.:10.00   
## Median : 0.0241 Median : 0.10 Median :20.00   
## Mean : -0.3442 Mean : -18.67 Mean :20.41   
## 3rd Qu.: 0.5919 3rd Qu.: 0.73 3rd Qu.:30.00   
## Max. : 2.5187 Max. : 3049.14 Max. :47.00   
##

#1.3 merging the two datasets based on the school IDs   
  
data\_jpal\_total <- merge(data\_jpal\_student, data\_jpal\_school ,by="schid")  
  
  
#looking for unique values cooresponding to school id in both datasets to identify which observations have been dropped in the merged dataset   
unique(data\_jpal\_school$schid)

## [1] 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118  
## [19] 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136  
## [37] 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154  
## [55] 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 201 202 203  
## [73] 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221  
## [91] 222 223 224 225 226 227 228 229 230 301 302 303 304 305 306 307 308 309  
## [109] 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327  
## [127] 328 329 330 331 332 333 334 335

unique(data\_jpal\_student$schid)

## [1] 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118  
## [19] 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136  
## [37] 137 138 139 140 141 142 143 144 146 147 148 149 150 151 152 153 154 155  
## [55] 156 157 158 159 160 161 162 163 164 165 166 167 168 169 201 202 203 204  
## [73] 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222  
## [91] 223 224 225 226 227 228 229 230 301 302 303 304 305 307 308 309 310 311  
## [109] 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329  
## [127] 330 331 332 333 334 335 336

#There are 40 observations dropped from the student database, as the school data does not have observations corresponding to school with "schid" = 145 and 3066. Similarly there are no observations for schid = 336 in the student data and observations for those in the total dataset is dropped.

summary(cars)

## speed dist   
## Min. : 4.0 Min. : 2.00   
## 1st Qu.:12.0 1st Qu.: 26.00   
## Median :15.0 Median : 36.00   
## Mean :15.4 Mean : 42.98   
## 3rd Qu.:19.0 3rd Qu.: 56.00   
## Max. :25.0 Max. :120.00

#Create a variable unique that combines the school id and the student number at that school. It should take value “10101” for the first student at school 101, “10102” for the second student at 101, and so on. What is the maximum value of the unique variable?  
  
#changing values of rows having numbers 1-9 to 01, 02,... 09 as shown below   
  
data\_jpal\_total$student\_number\_school[data\_jpal\_total$student\_number\_school == 1] <- "01"   
data\_jpal\_total$student\_number\_school[data\_jpal\_total$student\_number\_school == 2] <- "02"   
data\_jpal\_total$student\_number\_school[data\_jpal\_total$student\_number\_school == 3] <- "03"   
data\_jpal\_total$student\_number\_school[data\_jpal\_total$student\_number\_school == 4] <- "04"   
data\_jpal\_total$student\_number\_school[data\_jpal\_total$student\_number\_school == 5] <- "05"   
data\_jpal\_total$student\_number\_school[data\_jpal\_total$student\_number\_school == 6] <- "06"   
data\_jpal\_total$student\_number\_school[data\_jpal\_total$student\_number\_school == 7] <- "07"   
data\_jpal\_total$student\_number\_school[data\_jpal\_total$student\_number\_school == 8] <- "08"   
data\_jpal\_total$student\_number\_school[data\_jpal\_total$student\_number\_school == 9] <- "09"   
  
#changing the two columns into a column vector to allow for pasting values in the new column when combining schid numbers and student number at school.   
  
data\_jpal\_total$student\_number\_school <- as.character(data\_jpal\_total$student\_number\_school)  
data\_jpal\_total$schid <- as.character(data\_jpal\_total$schid)  
  
#combining the school id and the student number at school , the new variable is called new\_column as indicated below.   
data\_jpal\_total$new\_column <- paste(data\_jpal\_total$schid , data\_jpal\_total$student\_number\_school , sep = "")  
  
#changing the column of new\_variable to a numeric vector to be able to find the maximum value.   
data\_jpal\_total$new\_column <- as.numeric(data\_jpal\_total$new\_column)  
summary(data\_jpal\_total$new\_column)

## Min. 1st Qu. Median Mean 3rd Qu. Max.   
## 10101 13330 16732 20020 30130 33540

#The maximum value is 33540   
  
  
  
#2.2 Combine the date and time variables into one variable of the format: MM/DD/YYYY HH: MIN  
  
#changing the date, month, year, hour and time columns into character vectors   
  
data\_jpal\_total$survdd <- as.character(data\_jpal\_total$survdd)  
data\_jpal\_total$survmo <- as.character(data\_jpal\_total$survmo)  
data\_jpal\_total$survyy <- as.character(data\_jpal\_total$survyy)  
data\_jpal\_total$survhhst <- as.character(data\_jpal\_total$survhhst)  
data\_jpal\_total$survminst <- as.character(data\_jpal\_total$survminst)  
  
  
#combining the month, date and year values separated by "/"  
  
data\_jpal\_total$date\_time <- paste(data\_jpal\_total$survmo , data\_jpal\_total$survdd , data\_jpal\_total$survyy , sep = "/")  
  
#combining the hour with the MM/DD/YYYY format separated by a space   
  
data\_jpal\_total$date\_time <- paste(data\_jpal\_total$date\_time , data\_jpal\_total$survhhst , sep = " ")  
  
#combining the minutes with the MM/DD/YYYY HH format seaprated by ":"  
  
data\_jpal\_total$date\_time <- paste(data\_jpal\_total$date\_time , data\_jpal\_total$survminst , sep = ":")  
  
  
  
#extra cleaning of dataset   
  
data\_jpal\_total$gender[data\_jpal\_total$gender == " Male"] <- "Male"  
data\_jpal\_total$gender[data\_jpal\_total$gender == "Male "] <- "Male"  
data\_jpal\_total$gender[data\_jpal\_total$gender == "Female "] <- "Female"  
data\_jpal\_total$gender[data\_jpal\_total$gender == " Female"] <- "Female"  
data\_jpal\_total$gender[data\_jpal\_total$gender == "-999"] <- "-999"  
data\_jpal\_total$gender[data\_jpal\_total$gender == " -999"] <- "-999"  
  
unique(data\_jpal\_total$gender)

## [1] "Male" "Female" "-999" "-999 "

unique(data\_jpal\_total$region\_district)

## [1] "Western\_10" "Western\_1" "Western\_11"   
## [4] "Western\_2" "8\_Western" "-999"   
## [7] "Western\_2 " "Western\_4" "Western\_9"   
## [10] "Western\_3" "Western\_5" "Western\_8"   
## [13] "Western\_6" "Western\_\_5" "Western\_7"   
## [16] "Western\_\_4" "4\_Western" "Western\_12"   
## [19] "2\_Western" "10\_Western" "5\_Western"   
## [22] "Western\_\_2" "6\_Western" "-999 "   
## [25] "Greater Accra\_\_8" "8\_Greater Accra" "Greater Accra\_9"   
## [28] "Greater Accra\_4" "Greater Accra\_3" "Greater Accra\_12"   
## [31] "Greater Accra\_11" "Greater Accra\_5" "Greater Accra\_8"   
## [34] "Greater Accra\_10" "10\_Greater Accra" "Greater Accra\_\_10"  
## [37] "Greater Accra\_6" "Greater Accra\_1 " "Greater Accra\_7"   
## [40] "Greater Accra\_2" "1\_Western" "7\_Western"   
## [43] "Volta\_5" "Volta\_8" "Volta\_2"   
## [46] "Volta\_10" "Volta\_9" "Volta\_4"   
## [49] "Volta\_6" "Volta\_\_12" "Volta\_7"   
## [52] "4\_Volta" "Volta\_12" "8\_Volta"   
## [55] "Volta\_11" "Volta\_\_3"

data\_jpal\_total$region\_district[data\_jpal\_total$region\_district == "8\_Western"] <- "Western\_8" #assumption: these two are same   
data\_jpal\_total$region\_district[data\_jpal\_total$region\_district == "Western\_\_5" | data\_jpal\_total$region\_district == "5\_Western" ] <- "Western\_5" #assumption: these two are same   
data\_jpal\_total$region\_district[data\_jpal\_total$region\_district == "Western\_\_4" | data\_jpal\_total$region\_district == "4\_Western" ] <- "Western\_4"   
data\_jpal\_total$region\_district[data\_jpal\_total$region\_district == "2\_Western" | data\_jpal\_total$region\_district == "Western\_\_2" | data\_jpal\_total$region\_district == "Western\_2 " ] <- "Western\_2"   
data\_jpal\_total$region\_district[data\_jpal\_total$region\_district == "10\_Western"] <- "Western\_10"  
  
data\_jpal\_total$region\_district[data\_jpal\_total$region\_district == "6\_Western"] <- "Western\_6"   
data\_jpal\_total$region\_district[data\_jpal\_total$region\_district == "8\_Greater Accra" | data\_jpal\_total$region\_district == "Greater Accra\_\_8" ] <- "Greater Accra\_8"   
data\_jpal\_total$region\_district[data\_jpal\_total$region\_district == "10\_Greater Accra" | data\_jpal\_total$region\_district == "Greater Accra\_\_10"] <- "Greater Accra\_10"   
  
data\_jpal\_total$region\_district[data\_jpal\_total$region\_district == "1\_Western"] <- "Western\_1"   
  
data\_jpal\_total$region\_district[data\_jpal\_total$region\_district == "7\_Western" ] <- "Western\_7"   
  
data\_jpal\_total$region\_district[data\_jpal\_total$region\_district == "Volta\_\_12" ] <- "Volta\_12"  
  
data\_jpal\_total$region\_district[data\_jpal\_total$region\_district == "4\_Volta" ] <- "Volta\_4"  
  
data\_jpal\_total$region\_district[data\_jpal\_total$region\_district == "8\_Volta" ] <- "Volta\_8"   
  
data\_jpal\_total$region\_district[data\_jpal\_total$region\_district == "Volta\_\_3" ] <- "Volta\_3"   
  
data\_jpal\_total$region\_district[data\_jpal\_total$region\_district == "-999 " ] <- "-999"   
  
unique(data\_jpal\_total$region\_district)

## [1] "Western\_10" "Western\_1" "Western\_11" "Western\_2"   
## [5] "Western\_8" "-999" "Western\_4" "Western\_9"   
## [9] "Western\_3" "Western\_5" "Western\_6" "Western\_7"   
## [13] "Western\_12" "Greater Accra\_8" "Greater Accra\_9" "Greater Accra\_4"   
## [17] "Greater Accra\_3" "Greater Accra\_12" "Greater Accra\_11" "Greater Accra\_5"   
## [21] "Greater Accra\_10" "Greater Accra\_6" "Greater Accra\_1 " "Greater Accra\_7"   
## [25] "Greater Accra\_2" "Volta\_5" "Volta\_8" "Volta\_2"   
## [29] "Volta\_10" "Volta\_9" "Volta\_4" "Volta\_6"   
## [33] "Volta\_12" "Volta\_7" "Volta\_11" "Volta\_3"

## Including Plots

#3.1 What is the average value of savings at baseline? Round to 1 decimal point.  
  
mean(data\_jpal\_total$saveamt)

## [1] -0.4730696

#3.2 What is the average value of savings among men in the western region of Ghana at the endline? Round to 1 decimal point.  
  
#assuming western region is all regions starting with the prefix "Western" , selecting columns whose region is western   
  
data\_western <- data\_jpal\_total[str\_detect(data\_jpal\_total$region\_district, "Western"), ] # Extract matching rows with str\_detect  
head(data\_western)

## schid survdd survmo survyy survhhst survminst gender saveamt end\_saveamt  
## 1 101 13 10 2010 11 40 Male 2.3 11.0  
## 2 101 14 10 2010 11 34 Male 0.0 12.4  
## 3 101 13 10 2010 11 46 Male 0.0 11.0  
## 4 101 13 10 2010 11 44 Female 0.0 12.0  
## 5 101 13 10 2010 11 42 Female 0.0 12.0  
## 6 101 13 10 2010 12 21 Female 10.0 12.0  
## saving\_attitude\_index end\_saving\_attitude\_index student\_number\_school  
## 1 0.02414541 -6.844796e-02 01  
## 2 0.02414541 -6.844796e-02 02  
## 3 0.02414541 -8.018311e-01 03  
## 4 -1.86893120 -3.406296e+04 04  
## 5 0.02414541 3.155204e-02 05  
## 6 -0.49885469 1.265166e+00 06  
## region\_district samp new\_column date\_time  
## 1 Western\_10 Aflatoun 10101 10/13/2010 11:40  
## 2 Western\_10 Aflatoun 10102 10/14/2010 11:34  
## 3 Western\_10 Aflatoun 10103 10/13/2010 11:46  
## 4 Western\_10 Aflatoun 10104 10/13/2010 11:44  
## 5 Western\_10 Aflatoun 10105 10/13/2010 11:42  
## 6 Western\_10 Aflatoun 10106 10/13/2010 12:21

names(data\_western)

## [1] "schid" "survdd"   
## [3] "survmo" "survyy"   
## [5] "survhhst" "survminst"   
## [7] "gender" "saveamt"   
## [9] "end\_saveamt" "saving\_attitude\_index"   
## [11] "end\_saving\_attitude\_index" "student\_number\_school"   
## [13] "region\_district" "samp"   
## [15] "new\_column" "date\_time"

data\_western$gender <- as.character(data\_western$gender)  
data\_western <- data\_western %>% filter(data\_western$gender == "Male")  
  
mean(data\_western$end\_saveamt)

## [1] 0.2972319

#3.3 How many women are in the Aflatoun treatment group?  
unique(data\_jpal\_total$samp)

## [1] "Aflatoun" "SFE" "Control"

data\_aflatoun <- data\_jpal\_total %>% filter(data\_jpal\_total$samp == "Aflatoun")  
  
data\_aflatoun %>% count(gender)

## gender n  
## 1 -999 31  
## 2 -999 2  
## 3 Female 859  
## 4 Male 873

#3.4 Test whether the treatment arms are balanced on relevant covariates using an appropriate significance test. Use your results to answer the following questions:  
  
  
#removing na values from the data   
  
data\_jpal\_total <- na.omit(data\_jpal\_total)  
  
#creating dummies for the treatment groups   
data\_jpal\_total <- fastDummies::dummy\_cols(data\_jpal\_total , select\_columns = "samp")  
  
names(data\_jpal\_total)

## [1] "schid" "survdd"   
## [3] "survmo" "survyy"   
## [5] "survhhst" "survminst"   
## [7] "gender" "saveamt"   
## [9] "end\_saveamt" "saving\_attitude\_index"   
## [11] "end\_saving\_attitude\_index" "student\_number\_school"   
## [13] "region\_district" "samp"   
## [15] "new\_column" "date\_time"   
## [17] "samp\_Aflatoun" "samp\_Control"   
## [19] "samp\_SFE"

balance\_2 <- lm(samp\_Aflatoun ~ gender , data\_jpal\_total)  
balance\_3 <- lm(samp\_Aflatoun ~ saveamt , data\_jpal\_total)  
balance\_4 <- lm(samp\_Aflatoun ~ saving\_attitude\_index , data\_jpal\_total)  
balance\_5 <- lm(samp\_Aflatoun ~ region\_district , data\_jpal\_total)  
balance\_6 <- lm(samp\_Aflatoun ~ date\_time , data\_jpal\_total)  
balance\_7 <- lm(samp\_Control ~ gender, data\_jpal\_total)  
balance\_8 <- lm(samp\_Control ~ region\_district, data\_jpal\_total)  
balance\_9 <- lm(samp\_SFE ~ region\_district, data\_jpal\_total)  
  
#getting the coefficients for the above balanced tests   
#summary(balance\_2)  
#summary(balance\_3)  
#summary(balance\_4)  
#summary(balance\_5)  
#summary(balance\_6)  
##summary(balance\_7)  
#summary(balance\_8)  
  
  
  
#The dataset is not balanced in the variable region\_district   
  
  
#According to the balanced tests conducted, the treatment arms are not balanced in either of the regions

#4.1 What is the effect of receiving either of the treatments on the amount saved by students? Round to 2 decimal points. Use the appropriate regression to estimate this impact.  
  
  
#Because the treatment and control groups are not balanced in the region district we include it as a OBV   
names(data\_jpal\_total)

## [1] "schid" "survdd"   
## [3] "survmo" "survyy"   
## [5] "survhhst" "survminst"   
## [7] "gender" "saveamt"   
## [9] "end\_saveamt" "saving\_attitude\_index"   
## [11] "end\_saving\_attitude\_index" "student\_number\_school"   
## [13] "region\_district" "samp"   
## [15] "new\_column" "date\_time"   
## [17] "samp\_Aflatoun" "samp\_Control"   
## [19] "samp\_SFE"

regression\_1 <- lm(end\_saveamt ~ samp\_Aflatoun + samp\_SFE + region\_district , data\_jpal\_total)  
summary(regression\_1)

##   
## Call:  
## lm(formula = end\_saveamt ~ samp\_Aflatoun + samp\_SFE + region\_district,   
## data = data\_jpal\_total)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -1018.06 -0.49 7.23 16.17 1012.23   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) 0.46774 7.75454 0.060 0.951904   
## samp\_Aflatoun 17.67764 4.90083 3.607 0.000313 \*\*\*  
## samp\_SFE 4.02686 4.97157 0.810 0.417991   
## region\_districtGreater Accra\_1 6.05226 20.58576 0.294 0.768768   
## region\_districtGreater Accra\_10 2.93959 12.81248 0.229 0.818542   
## region\_districtGreater Accra\_11 -10.35449 15.54095 -0.666 0.505267   
## region\_districtGreater Accra\_12 0.91712 20.49565 0.045 0.964311   
## region\_districtGreater Accra\_2 13.77969 15.70399 0.877 0.380275   
## region\_districtGreater Accra\_3 -34.47501 15.36251 -2.244 0.024868 \*   
## region\_districtGreater Accra\_4 -44.04210 13.65456 -3.225 0.001266 \*\*   
## region\_districtGreater Accra\_5 -24.91862 13.42390 -1.856 0.063469 .   
## region\_districtGreater Accra\_6 8.48500 15.45375 0.549 0.582990   
## region\_districtGreater Accra\_7 15.77713 20.81100 0.758 0.448417   
## region\_districtGreater Accra\_8 -15.66037 13.38391 -1.170 0.242019   
## region\_districtGreater Accra\_9 4.66514 20.95736 0.223 0.823854   
## region\_districtVolta\_10 -5.05270 12.03443 -0.420 0.674610   
## region\_districtVolta\_11 -12.60774 20.58576 -0.612 0.540267   
## region\_districtVolta\_12 -11.73359 15.54661 -0.755 0.450441   
## region\_districtVolta\_2 0.02251 15.46954 0.001 0.998839   
## region\_districtVolta\_3 12.67476 20.58576 0.616 0.538116   
## region\_districtVolta\_4 -13.72267 10.51619 -1.305 0.191982   
## region\_districtVolta\_5 -16.63698 12.37556 -1.344 0.178897   
## region\_districtVolta\_6 -1.95788 20.49565 -0.096 0.923900   
## region\_districtVolta\_7 -40.71374 15.46954 -2.632 0.008517 \*\*   
## region\_districtVolta\_8 -41.32385 13.52070 -3.056 0.002252 \*\*   
## region\_districtVolta\_9 -0.67102 20.72187 -0.032 0.974168   
## region\_districtWestern\_1 -10.13061 9.92191 -1.021 0.307286   
## region\_districtWestern\_10 -9.57349 10.49199 -0.912 0.361571   
## region\_districtWestern\_11 -7.50211 12.51120 -0.600 0.548778   
## region\_districtWestern\_12 -6.58878 13.38837 -0.492 0.622651   
## region\_districtWestern\_2 -11.76937 9.74714 -1.207 0.227306   
## region\_districtWestern\_3 -7.57464 10.60695 -0.714 0.475185   
## region\_districtWestern\_4 -1.00021 10.72997 -0.093 0.925735   
## region\_districtWestern\_5 2.91975 10.47669 0.279 0.780494   
## region\_districtWestern\_6 -30.83612 13.22026 -2.332 0.019713 \*   
## region\_districtWestern\_7 8.52552 11.73617 0.726 0.467607   
## region\_districtWestern\_8 -0.25075 9.91098 -0.025 0.979816   
## region\_districtWestern\_9 -10.48861 11.30125 -0.928 0.353403   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 120.6 on 5175 degrees of freedom  
## Multiple R-squared: 0.01236, Adjusted R-squared: 0.005298   
## F-statistic: 1.75 on 37 and 5175 DF, p-value: 0.003328

#4.2 Run regressions to estimate the impact of the two treatments on the saving amount and the saving attitude.  
  
  
regression\_2 <- lm(end\_saveamt ~ samp\_Aflatoun + region\_district , data\_jpal\_total)  
regression\_3 <- lm(end\_saveamt ~ samp\_SFE+ region\_district , data\_jpal\_total)  
regression\_4 <- lm(end\_saving\_attitude\_index ~ samp\_Aflatoun + region\_district , data\_jpal\_total)  
regression\_5 <- lm(end\_saving\_attitude\_index ~ samp\_SFE + region\_district , data\_jpal\_total)  
  
  
summary(regression\_2)

##   
## Call:  
## lm(formula = end\_saveamt ~ samp\_Aflatoun + region\_district, data = data\_jpal\_total)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -1018.06 -1.07 7.85 15.74 1013.67   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) 1.6516 7.6153 0.217 0.828313   
## samp\_Aflatoun 15.6261 4.1955 3.725 0.000198 \*\*\*  
## region\_districtGreater Accra\_1 4.8684 20.5331 0.237 0.812588   
## region\_districtGreater Accra\_10 5.7826 12.3219 0.469 0.638878   
## region\_districtGreater Accra\_11 -8.5117 15.3730 -0.554 0.579825   
## region\_districtGreater Accra\_12 1.7848 20.4670 0.087 0.930514   
## region\_districtGreater Accra\_2 12.5959 15.6353 0.806 0.420509   
## region\_districtGreater Accra\_3 -33.6074 15.3246 -2.193 0.028349 \*   
## region\_districtGreater Accra\_4 -41.9033 13.3964 -3.128 0.001770 \*\*   
## region\_districtGreater Accra\_5 -23.3756 13.2876 -1.759 0.078602 .   
## region\_districtGreater Accra\_6 9.3892 15.4129 0.609 0.542434   
## region\_districtGreater Accra\_7 14.5933 20.7589 0.703 0.482094   
## region\_districtGreater Accra\_8 -14.1231 13.2482 -1.066 0.286456   
## region\_districtGreater Accra\_9 5.5328 20.9293 0.264 0.791515   
## region\_districtVolta\_10 -4.2042 11.9883 -0.351 0.725835   
## region\_districtVolta\_11 -13.7916 20.5331 -0.672 0.501821   
## region\_districtVolta\_12 -9.8658 15.3741 -0.642 0.521089   
## region\_districtVolta\_2 1.8778 15.2985 0.123 0.902312   
## region\_districtVolta\_3 11.4909 20.5331 0.560 0.575757   
## region\_districtVolta\_4 -12.3175 10.3718 -1.188 0.235045   
## region\_districtVolta\_5 -15.3946 12.2797 -1.254 0.210024   
## region\_districtVolta\_6 -1.0902 20.4670 -0.053 0.957521   
## region\_districtVolta\_7 -38.8584 15.2985 -2.540 0.011114 \*   
## region\_districtVolta\_8 -39.1282 13.2457 -2.954 0.003151 \*\*   
## region\_districtVolta\_9 0.1966 20.6935 0.010 0.992419   
## region\_districtWestern\_1 -9.7774 9.9120 -0.986 0.323971   
## region\_districtWestern\_10 -7.8813 10.2815 -0.767 0.443386   
## region\_districtWestern\_11 -6.9737 12.4938 -0.558 0.576748   
## region\_districtWestern\_12 -6.4303 13.3865 -0.480 0.630992   
## region\_districtWestern\_2 -11.6062 9.7447 -1.191 0.233700   
## region\_districtWestern\_3 -7.3303 10.6023 -0.691 0.489353   
## region\_districtWestern\_4 -0.1495 10.6781 -0.014 0.988834   
## region\_districtWestern\_5 2.6281 10.4701 0.251 0.801817   
## region\_districtWestern\_6 -31.3361 13.2054 -2.373 0.017682 \*   
## region\_districtWestern\_7 10.5550 11.4652 0.921 0.357294   
## region\_districtWestern\_8 1.2584 9.7339 0.129 0.897138   
## region\_districtWestern\_9 -10.4709 11.3009 -0.927 0.354199   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 120.6 on 5176 degrees of freedom  
## Multiple R-squared: 0.01223, Adjusted R-squared: 0.005364   
## F-statistic: 1.781 on 36 and 5176 DF, p-value: 0.002822

summary(regression\_3)

##   
## Call:  
## lm(formula = end\_saveamt ~ samp\_SFE + region\_district, data = data\_jpal\_total)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -1018.06 -0.67 7.42 17.31 1013.68   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) 10.669 7.229 1.476 0.14004   
## samp\_SFE -5.241 4.261 -1.230 0.21877   
## region\_districtGreater Accra\_1 -4.149 20.414 -0.203 0.83896   
## region\_districtGreater Accra\_10 2.006 12.825 0.156 0.87569   
## region\_districtGreater Accra\_11 -7.030 15.532 -0.453 0.65085   
## region\_districtGreater Accra\_12 8.394 20.414 0.411 0.68097   
## region\_districtGreater Accra\_2 3.579 15.465 0.231 0.81701   
## region\_districtGreater Accra\_3 -26.998 15.240 -1.772 0.07652 .   
## region\_districtGreater Accra\_4 -41.977 13.658 -3.073 0.00213 \*\*  
## region\_districtGreater Accra\_5 -20.317 13.379 -1.519 0.12892   
## region\_districtGreater Accra\_6 3.089 15.399 0.201 0.84100   
## region\_districtGreater Accra\_7 5.576 20.642 0.270 0.78707   
## region\_districtGreater Accra\_8 -11.035 13.338 -0.827 0.40809   
## region\_districtGreater Accra\_9 12.142 20.879 0.582 0.56091   
## region\_districtVolta\_10 -4.139 12.046 -0.344 0.73115   
## region\_districtVolta\_11 -22.809 20.414 -1.117 0.26392   
## region\_districtVolta\_12 -8.515 15.539 -0.548 0.58372   
## region\_districtVolta\_2 3.294 15.461 0.213 0.83129   
## region\_districtVolta\_3 2.474 20.414 0.121 0.90356   
## region\_districtVolta\_4 -16.108 10.508 -1.533 0.12535   
## region\_districtVolta\_5 -17.799 12.386 -1.437 0.15076   
## region\_districtVolta\_6 5.519 20.414 0.270 0.78691   
## region\_districtVolta\_7 -37.442 15.461 -2.422 0.01548 \*   
## region\_districtVolta\_8 -39.501 13.527 -2.920 0.00351 \*\*  
## region\_districtVolta\_9 6.806 20.642 0.330 0.74164   
## region\_districtWestern\_1 -7.087 9.897 -0.716 0.47398   
## region\_districtWestern\_10 -9.394 10.504 -0.894 0.37119   
## region\_districtWestern\_11 -10.113 12.505 -0.809 0.41871   
## region\_districtWestern\_12 -13.701 13.258 -1.033 0.30146   
## region\_districtWestern\_2 -15.975 9.688 -1.649 0.09923 .   
## region\_districtWestern\_3 -10.328 10.592 -0.975 0.32955   
## region\_districtWestern\_4 -2.182 10.737 -0.203 0.83898   
## region\_districtWestern\_5 -3.294 10.346 -0.318 0.75019   
## region\_districtWestern\_6 -35.145 13.181 -2.666 0.00769 \*\*  
## region\_districtWestern\_7 5.720 11.724 0.488 0.62565   
## region\_districtWestern\_8 -1.375 9.918 -0.139 0.88976   
## region\_districtWestern\_9 -15.320 11.235 -1.364 0.17274   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 120.7 on 5176 degrees of freedom  
## Multiple R-squared: 0.009876, Adjusted R-squared: 0.00299   
## F-statistic: 1.434 on 36 and 5176 DF, p-value: 0.04499

summary(regression\_4)

##   
## Call:  
## lm(formula = end\_saving\_attitude\_index ~ samp\_Aflatoun + region\_district,   
## data = data\_jpal\_total)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -33918 3 10 23 3072   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) 7.561 30.918 0.245 0.8068   
## samp\_Aflatoun -19.200 17.034 -1.127 0.2597   
## region\_districtGreater Accra\_1 -7.173 83.364 -0.086 0.9314   
## region\_districtGreater Accra\_10 -13.685 50.027 -0.274 0.7844   
## region\_districtGreater Accra\_11 -10.112 62.414 -0.162 0.8713   
## region\_districtGreater Accra\_12 -12.846 83.095 -0.155 0.8772   
## region\_districtGreater Accra\_2 -20.213 63.479 -0.318 0.7502   
## region\_districtGreater Accra\_3 -24.937 62.218 -0.401 0.6886   
## region\_districtGreater Accra\_4 -43.848 54.389 -0.806 0.4202   
## region\_districtGreater Accra\_5 -20.251 53.947 -0.375 0.7074   
## region\_districtGreater Accra\_6 -7.179 62.576 -0.115 0.9087   
## region\_districtGreater Accra\_7 -7.427 84.281 -0.088 0.9298   
## region\_districtGreater Accra\_8 -11.356 53.787 -0.211 0.8328   
## region\_districtGreater Accra\_9 11.724 84.972 0.138 0.8903   
## region\_districtVolta\_10 -10.591 48.672 -0.218 0.8277   
## region\_districtVolta\_11 -32.593 83.364 -0.391 0.6958   
## region\_districtVolta\_12 -10.665 62.419 -0.171 0.8643   
## region\_districtVolta\_2 2.099 62.112 0.034 0.9730   
## region\_districtVolta\_3 -7.632 83.364 -0.092 0.9271   
## region\_districtVolta\_4 -22.776 42.109 -0.541 0.5886   
## region\_districtVolta\_5 -22.560 49.855 -0.452 0.6509   
## region\_districtVolta\_6 11.233 83.095 0.135 0.8925   
## region\_districtVolta\_7 -35.417 62.112 -0.570 0.5686   
## region\_districtVolta\_8 -43.325 53.777 -0.806 0.4205   
## region\_districtVolta\_9 11.529 84.015 0.137 0.8909   
## region\_districtWestern\_1 -5.446 40.242 -0.135 0.8924   
## region\_districtWestern\_10 -133.456 41.743 -3.197 0.0014 \*\*  
## region\_districtWestern\_11 -14.066 50.724 -0.277 0.7816   
## region\_districtWestern\_12 -15.846 54.349 -0.292 0.7706   
## region\_districtWestern\_2 -11.368 39.563 -0.287 0.7739   
## region\_districtWestern\_3 -13.517 43.045 -0.314 0.7535   
## region\_districtWestern\_4 -9.156 43.353 -0.211 0.8327   
## region\_districtWestern\_5 -11.995 42.509 -0.282 0.7778   
## region\_districtWestern\_6 -34.460 53.614 -0.643 0.5204   
## region\_districtWestern\_7 -7.273 46.548 -0.156 0.8758   
## region\_districtWestern\_8 2.239 39.520 0.057 0.9548   
## region\_districtWestern\_9 -18.713 45.881 -0.408 0.6834   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 489.6 on 5176 degrees of freedom  
## Multiple R-squared: 0.003813, Adjusted R-squared: -0.003116   
## F-statistic: 0.5503 on 36 and 5176 DF, p-value: 0.9867

summary(regression\_5)

##   
## Call:  
## lm(formula = end\_saving\_attitude\_index ~ samp\_SFE + region\_district,   
## data = data\_jpal\_total)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -33920 3 12 20 3062   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) -3.519 29.313 -0.120 0.90444   
## samp\_SFE 21.157 17.279 1.224 0.22085   
## region\_districtGreater Accra\_1 3.907 82.781 0.047 0.96236   
## region\_districtGreater Accra\_10 -23.762 52.005 -0.457 0.64775   
## region\_districtGreater Accra\_11 -19.199 62.981 -0.305 0.76051   
## region\_districtGreater Accra\_12 -20.966 82.781 -0.253 0.80007   
## region\_districtGreater Accra\_2 -9.133 62.712 -0.146 0.88421   
## region\_districtGreater Accra\_3 -33.057 61.798 -0.535 0.59272   
## region\_districtGreater Accra\_4 -53.228 55.385 -0.961 0.33657   
## region\_districtGreater Accra\_5 -29.040 54.251 -0.535 0.59247   
## region\_districtGreater Accra\_6 -7.069 62.444 -0.113 0.90987   
## region\_districtGreater Accra\_7 3.652 83.704 0.044 0.96520   
## region\_districtGreater Accra\_8 -20.140 54.085 -0.372 0.70963   
## region\_districtGreater Accra\_9 3.603 84.665 0.043 0.96605   
## region\_districtVolta\_10 -14.374 48.846 -0.294 0.76857   
## region\_districtVolta\_11 -21.513 82.781 -0.260 0.79497   
## region\_districtVolta\_12 -19.777 63.011 -0.314 0.75364   
## region\_districtVolta\_2 -7.000 62.694 -0.112 0.91111   
## region\_districtVolta\_3 3.448 82.781 0.042 0.96678   
## region\_districtVolta\_4 -26.506 42.609 -0.622 0.53392   
## region\_districtVolta\_5 -26.473 50.225 -0.527 0.59815   
## region\_districtVolta\_6 3.113 82.781 0.038 0.97001   
## region\_districtVolta\_7 -44.516 62.694 -0.710 0.47771   
## region\_districtVolta\_8 -52.760 54.852 -0.962 0.33616   
## region\_districtVolta\_9 3.408 83.704 0.041 0.96752   
## region\_districtWestern\_1 -8.751 40.135 -0.218 0.82740   
## region\_districtWestern\_10 -139.931 42.594 -3.285 0.00103 \*\*  
## region\_districtWestern\_11 -14.354 50.707 -0.283 0.77712   
## region\_districtWestern\_12 -11.818 53.761 -0.220 0.82601   
## region\_districtWestern\_2 -9.247 39.287 -0.235 0.81393   
## region\_districtWestern\_3 -12.645 42.950 -0.294 0.76845   
## region\_districtWestern\_4 -11.585 43.541 -0.266 0.79020   
## region\_districtWestern\_5 -6.860 41.954 -0.164 0.87012   
## region\_districtWestern\_6 -29.780 53.451 -0.557 0.57745   
## region\_districtWestern\_7 -13.075 47.541 -0.275 0.78330   
## region\_districtWestern\_8 -2.702 40.216 -0.067 0.94644   
## region\_districtWestern\_9 -15.639 45.557 -0.343 0.73140   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 489.6 on 5176 degrees of freedom  
## Multiple R-squared: 0.003857, Adjusted R-squared: -0.003072   
## F-statistic: 0.5567 on 36 and 5176 DF, p-value: 0.9853

#4.3 Estimate the differential effect of the treatment on the savings amount by gender  
  
data\_males <- data\_jpal\_total %>% filter(data\_jpal\_total$gender == "Male")  
data\_females <- data\_jpal\_total %>% filter(data\_jpal\_total$gender == "Female")  
regression\_6 <- lm(end\_saveamt ~ samp\_SFE + samp\_Aflatoun + region\_district , data\_males)  
regression\_7 <- lm(end\_saveamt ~ samp\_SFE + samp\_Aflatoun + region\_district, data\_females)  
summary(regression\_6)

##   
## Call:  
## lm(formula = end\_saveamt ~ samp\_SFE + samp\_Aflatoun + region\_district,   
## data = data\_males)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -1017.05 -4.11 3.70 15.13 1000.16   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) -3.6989 10.0794 -0.367 0.713668   
## samp\_SFE 8.7836 6.6978 1.311 0.189835   
## samp\_Aflatoun 20.5255 6.5438 3.137 0.001728 \*\*   
## region\_districtGreater Accra\_1 9.2119 25.8817 0.356 0.721926   
## region\_districtGreater Accra\_10 2.0292 16.9311 0.120 0.904610   
## region\_districtGreater Accra\_11 4.4573 20.6124 0.216 0.828816   
## region\_districtGreater Accra\_12 46.4234 27.4101 1.694 0.090451 .   
## region\_districtGreater Accra\_2 34.3827 21.3270 1.612 0.107048   
## region\_districtGreater Accra\_3 4.2960 22.7909 0.188 0.850502   
## region\_districtGreater Accra\_4 -15.7171 18.4058 -0.854 0.393229   
## region\_districtGreater Accra\_5 -17.9315 18.9241 -0.948 0.343448   
## region\_districtGreater Accra\_6 20.6011 21.7566 0.947 0.343783   
## region\_districtGreater Accra\_7 27.0936 28.0980 0.964 0.335008   
## region\_districtGreater Accra\_8 4.2073 18.9308 0.222 0.824138   
## region\_districtGreater Accra\_9 4.7325 26.3041 0.180 0.857233   
## region\_districtVolta\_10 3.7190 15.0689 0.247 0.805085   
## region\_districtVolta\_11 -14.2118 23.8408 -0.596 0.551152   
## region\_districtVolta\_12 2.5924 18.7226 0.138 0.889883   
## region\_districtVolta\_2 2.3227 18.9662 0.122 0.902541   
## region\_districtVolta\_3 22.6589 24.9880 0.907 0.364602   
## region\_districtVolta\_4 -2.2477 13.7077 -0.164 0.869767   
## region\_districtVolta\_5 2.4782 15.6864 0.158 0.874483   
## region\_districtVolta\_6 -2.3837 26.8364 -0.089 0.929229   
## region\_districtVolta\_7 -53.0765 20.8201 -2.549 0.010852 \*   
## region\_districtVolta\_8 -64.3536 17.8347 -3.608 0.000314 \*\*\*  
## region\_districtVolta\_9 1.1734 27.4101 0.043 0.965856   
## region\_districtWestern\_1 -1.2081 13.3283 -0.091 0.927782   
## region\_districtWestern\_10 -20.5464 14.3041 -1.436 0.151009   
## region\_districtWestern\_11 -1.1012 16.5769 -0.066 0.947040   
## region\_districtWestern\_12 5.2296 19.5693 0.267 0.789310   
## region\_districtWestern\_2 -9.0007 13.1648 -0.684 0.494227   
## region\_districtWestern\_3 -9.1584 13.6072 -0.673 0.500973   
## region\_districtWestern\_4 1.2220 14.2449 0.086 0.931643   
## region\_districtWestern\_5 1.7401 13.8733 0.125 0.900192   
## region\_districtWestern\_6 -11.7892 17.9870 -0.655 0.512250   
## region\_districtWestern\_7 7.2146 15.7863 0.457 0.647697   
## region\_districtWestern\_8 -0.7082 13.1229 -0.054 0.956967   
## region\_districtWestern\_9 -11.4289 14.7945 -0.773 0.439881   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 114.3 on 2576 degrees of freedom  
## Multiple R-squared: 0.02129, Adjusted R-squared: 0.007237   
## F-statistic: 1.515 on 37 and 2576 DF, p-value: 0.02422

summary(regression\_7)

##   
## Call:  
## lm(formula = end\_saveamt ~ samp\_SFE + samp\_Aflatoun + region\_district,   
## data = data\_females)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -1007.98 -3.48 9.51 22.64 991.02   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) 6.5560 12.0633 0.543 0.586856   
## samp\_SFE -0.2659 7.4759 -0.036 0.971630   
## samp\_Aflatoun 12.7324 7.4280 1.714 0.086633 .   
## region\_districtGreater Accra\_1 1.3263 32.9692 0.040 0.967914   
## region\_districtGreater Accra\_10 0.9879 19.6771 0.050 0.959961   
## region\_districtGreater Accra\_11 -29.2033 24.1521 -1.209 0.226724   
## region\_districtGreater Accra\_12 -47.8937 31.2378 -1.533 0.125354   
## region\_districtGreater Accra\_2 -10.6073 23.5775 -0.450 0.652827   
## region\_districtGreater Accra\_3 -67.0498 22.2979 -3.007 0.002665 \*\*   
## region\_districtGreater Accra\_4 -78.5025 20.9395 -3.749 0.000182 \*\*\*  
## region\_districtGreater Accra\_5 -33.9700 19.6600 -1.728 0.084135 .   
## region\_districtGreater Accra\_6 -3.0772 22.3571 -0.138 0.890537   
## region\_districtGreater Accra\_7 2.8965 30.7531 0.094 0.924970   
## region\_districtGreater Accra\_8 -32.5413 19.4508 -1.673 0.094451 .   
## region\_districtGreater Accra\_9 5.2428 33.6711 0.156 0.876277   
## region\_districtVolta\_10 -19.3100 19.6034 -0.985 0.324704   
## region\_districtVolta\_11 -5.5651 40.0061 -0.139 0.889377   
## region\_districtVolta\_12 -3.3693 27.8600 -0.121 0.903752   
## region\_districtVolta\_2 -4.4619 26.3047 -0.170 0.865321   
## region\_districtVolta\_3 -2.8632 35.8986 -0.080 0.936436   
## region\_districtVolta\_4 -29.9279 16.3435 -1.831 0.067192 .   
## region\_districtVolta\_5 -44.4442 19.8844 -2.235 0.025497 \*   
## region\_districtVolta\_6 -0.7884 32.7857 -0.024 0.980816   
## region\_districtVolta\_7 -30.7493 23.1879 -1.326 0.184929   
## region\_districtVolta\_8 -18.3804 20.7766 -0.885 0.376422   
## region\_districtVolta\_9 -2.5940 31.9781 -0.081 0.935355   
## region\_districtWestern\_1 -18.3739 14.9042 -1.233 0.217765   
## region\_districtWestern\_10 -2.3916 15.6334 -0.153 0.878425   
## region\_districtWestern\_11 -16.3088 18.9340 -0.861 0.389129   
## region\_districtWestern\_12 -17.4367 18.8893 -0.923 0.356046   
## region\_districtWestern\_2 -16.0639 14.6252 -1.098 0.272148   
## region\_districtWestern\_3 -6.6123 16.7155 -0.396 0.692448   
## region\_districtWestern\_4 -4.8851 16.3315 -0.299 0.764873   
## region\_districtWestern\_5 2.4236 15.9102 0.152 0.878938   
## region\_districtWestern\_6 -49.4110 19.5063 -2.533 0.011367 \*   
## region\_districtWestern\_7 7.2633 17.6486 0.412 0.680706   
## region\_districtWestern\_8 -1.4605 15.0910 -0.097 0.922909   
## region\_districtWestern\_9 -11.4818 17.4796 -0.657 0.511325   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 126.5 on 2492 degrees of freedom  
## Multiple R-squared: 0.02051, Adjusted R-squared: 0.005967   
## F-statistic: 1.41 on 37 and 2492 DF, p-value: 0.05184

# 4.3a effect of the Aflatoun treatment on the amount of savings among women  
  
regression\_8 <- lm(end\_saveamt ~ samp\_Aflatoun + region\_district , data\_females)  
summary(regression\_8)

##   
## Call:  
## lm(formula = end\_saveamt ~ samp\_Aflatoun + region\_district, data = data\_females)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -1007.92 -3.54 9.60 22.67 991.08   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) 6.4764 11.8515 0.546 0.584795   
## samp\_Aflatoun 12.8630 6.4551 1.993 0.046405 \*   
## region\_districtGreater Accra\_1 1.4059 32.8866 0.043 0.965904   
## region\_districtGreater Accra\_10 0.8016 18.9634 0.042 0.966285   
## region\_districtGreater Accra\_11 -29.3295 23.8854 -1.228 0.219592   
## region\_districtGreater Accra\_12 -47.9447 31.1986 -1.537 0.124479   
## region\_districtGreater Accra\_2 -10.5277 23.4663 -0.449 0.653737   
## region\_districtGreater Accra\_3 -67.1008 22.2472 -3.016 0.002586 \*\*   
## region\_districtGreater Accra\_4 -78.6387 20.5822 -3.821 0.000136 \*\*\*  
## region\_districtGreater Accra\_5 -34.0661 19.4695 -1.750 0.080291 .   
## region\_districtGreater Accra\_6 -3.1453 22.2705 -0.141 0.887697   
## region\_districtGreater Accra\_7 2.9761 30.6654 0.097 0.922695   
## region\_districtGreater Accra\_8 -32.6339 19.2717 -1.693 0.090512 .   
## region\_districtGreater Accra\_9 5.1918 33.6337 0.154 0.877336   
## region\_districtVolta\_10 -19.3449 19.5749 -0.988 0.323126   
## region\_districtVolta\_11 -5.4855 39.9354 -0.137 0.890757   
## region\_districtVolta\_12 -3.4852 27.6631 -0.126 0.899752   
## region\_districtVolta\_2 -4.5922 26.0430 -0.176 0.860049   
## region\_districtVolta\_3 -2.7836 35.8216 -0.078 0.938067   
## region\_districtVolta\_4 -30.0075 16.1863 -1.854 0.063873 .   
## region\_districtVolta\_5 -44.5311 19.7299 -2.257 0.024092 \*   
## region\_districtVolta\_6 -0.8395 32.7477 -0.026 0.979551   
## region\_districtVolta\_7 -30.8714 22.9280 -1.346 0.178280   
## region\_districtVolta\_8 -18.5126 20.4374 -0.906 0.365120   
## region\_districtVolta\_9 -2.6450 31.9395 -0.083 0.934007   
## region\_districtWestern\_1 -18.3978 14.8862 -1.236 0.216613   
## region\_districtWestern\_10 -2.4974 15.3446 -0.163 0.870724   
## region\_districtWestern\_11 -16.3178 18.9285 -0.862 0.388729   
## region\_districtWestern\_12 -17.4325 18.8852 -0.923 0.356055   
## region\_districtWestern\_2 -16.0749 14.6190 -1.100 0.271615   
## region\_districtWestern\_3 -6.6178 16.7114 -0.396 0.692134   
## region\_districtWestern\_4 -4.9247 16.2902 -0.302 0.762440   
## region\_districtWestern\_5 2.4460 15.8945 0.154 0.877706   
## region\_districtWestern\_6 -49.3702 19.4686 -2.536 0.011277 \*   
## region\_districtWestern\_7 7.1375 17.2875 0.413 0.679736   
## region\_districtWestern\_8 -1.5616 14.8180 -0.105 0.916080   
## region\_districtWestern\_9 -11.4748 17.4750 -0.657 0.511473   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 126.5 on 2493 degrees of freedom  
## Multiple R-squared: 0.02051, Adjusted R-squared: 0.006365   
## F-statistic: 1.45 on 36 and 2493 DF, p-value: 0.04101

#4.3b What is the effect of the SFE treatment on the amount of savings among males  
  
regression\_9 <- lm(end\_saveamt ~ samp\_SFE + region\_district, data\_males)  
summary(regression\_9)

##   
## Call:  
## lm(formula = end\_saveamt ~ samp\_SFE + region\_district, data = data\_males)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -1011.98 -3.71 3.87 15.49 1001.60   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) 7.4714 9.4455 0.791 0.429014   
## samp\_SFE -2.3315 5.6934 -0.410 0.682198   
## region\_districtGreater Accra\_1 -1.9584 25.6794 -0.076 0.939216   
## region\_districtGreater Accra\_10 1.9740 16.9601 0.116 0.907352   
## region\_districtGreater Accra\_11 9.5777 20.5829 0.465 0.641737   
## region\_districtGreater Accra\_12 55.7786 27.2940 2.044 0.041093 \*   
## region\_districtGreater Accra\_2 23.2124 21.0636 1.102 0.270559   
## region\_districtGreater Accra\_3 13.6512 22.6336 0.603 0.546471   
## region\_districtGreater Accra\_4 -12.9156 18.4156 -0.701 0.483155   
## region\_districtGreater Accra\_5 -11.9641 18.8605 -0.634 0.525910   
## region\_districtGreater Accra\_6 14.8296 21.7158 0.683 0.494736   
## region\_districtGreater Accra\_7 15.9233 27.9191 0.570 0.568499   
## region\_districtGreater Accra\_8 9.9865 18.8732 0.529 0.596754   
## region\_districtGreater Accra\_9 14.0877 26.1792 0.538 0.590538   
## region\_districtVolta\_10 5.5084 15.0839 0.365 0.715003   
## region\_districtVolta\_11 -25.3821 23.6137 -1.075 0.282525   
## region\_districtVolta\_12 7.2424 18.6958 0.387 0.698506   
## region\_districtVolta\_2 7.3491 18.9308 0.388 0.697895   
## region\_districtVolta\_3 11.4886 24.7753 0.464 0.642894   
## region\_districtVolta\_4 -3.7385 13.7230 -0.272 0.785314   
## region\_districtVolta\_5 3.5782 15.7093 0.228 0.819837   
## region\_districtVolta\_6 6.9714 26.7159 0.261 0.794154   
## region\_districtVolta\_7 -48.0646 20.7943 -2.311 0.020888 \*   
## region\_districtVolta\_8 -61.9803 17.8491 -3.472 0.000524 \*\*\*  
## region\_districtVolta\_9 10.5286 27.2940 0.386 0.699716   
## region\_districtWestern\_1 1.9480 13.3130 0.146 0.883676   
## region\_districtWestern\_10 -19.4784 14.3245 -1.360 0.174014   
## region\_districtWestern\_11 -2.2712 16.6011 -0.137 0.891193   
## region\_districtWestern\_12 -1.3497 19.4899 -0.069 0.944794   
## region\_districtWestern\_2 -13.3723 13.1132 -1.020 0.307940   
## region\_districtWestern\_3 -10.8660 13.6196 -0.798 0.425049   
## region\_districtWestern\_4 -0.3441 14.2606 -0.024 0.980751   
## region\_districtWestern\_5 -4.8973 13.7344 -0.357 0.721443   
## region\_districtWestern\_6 -15.2625 17.9837 -0.849 0.396135   
## region\_districtWestern\_7 5.2874 15.8014 0.335 0.737942   
## region\_districtWestern\_8 -1.1071 13.1448 -0.084 0.932888   
## region\_districtWestern\_9 -15.5504 14.7612 -1.053 0.292227   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 114.5 on 2577 degrees of freedom  
## Multiple R-squared: 0.01756, Adjusted R-squared: 0.003832   
## F-statistic: 1.279 on 36 and 2577 DF, p-value: 0.1239

write.csv(data\_jpal\_total,"/Users/bhargavithakur/Desktop/r\_test\_j\_pal/edited.csv", row.names = FALSE)