### BSc Population Health Dissertation (18/19)

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```
library(data.table)
library(readr)
library(foreign)
library(haven)
library(grid)
library(gridExtra)
library(factoextra)
## Loading required package: ggplot2
## Welcome! Related Books: `Practical Guide To Cluster Analysis in R` at https://goo.gl/13EFCZ
library(PerformanceAnalytics)
## Loading required package: xts
## Warning: package 'xts' was built under R version 3.4.4
## Loading required package: zoo
##
## Attaching package: 'zoo'
## The following objects are masked from 'package:base':
##
      as.Date, as.Date.numeric
##
## Attaching package: 'xts'
## The following objects are masked from 'package:data.table':
##
##
      first, last
##
## Attaching package: 'PerformanceAnalytics'
## The following object is masked from 'package:graphics':
##
      legend
library(factoextra)
library(ca)
library(highcharter)
## Highcharts (www.highcharts.com) is a Highsoft software product which is
## not free for commercial and Governmental use
library(tidyverse)
## -- Attaching packages ----- tidyverse 1.2.1 --
```

```
v dplyr 0.7.4
## v tibble 1.4.2
## v tidyr 0.8.2 v stringr 1.2.0
## v purrr
           0.2.4
                     v forcats 0.2.0
## Warning: package 'tidyr' was built under R version 3.4.4
## -- Conflicts ----- tidyverse_conflicts() --
## x dplyr::between()
                       masks data.table::between()
## x dplyr::combine()
                       masks gridExtra::combine()
## x dplyr::filter()
                       masks stats::filter()
## x dplyr::first()
                       masks xts::first(), data.table::first()
## x dplyr::lag()
                       masks stats::lag()
## x dplyr::last()
                       masks xts::last(), data.table::last()
## x purrr::transpose() masks data.table::transpose()
library(rwars)
library(Matching)
## Loading required package: MASS
## Attaching package: 'MASS'
## The following object is masked from 'package:dplyr':
##
##
      select
## ##
## ## Matching (Version 4.9-2, Build Date: 2015-12-25)
## ## See http://sekhon.berkeley.edu/matching for additional documentation.
## ## Please cite software as:
## ##
       Jasjeet S. Sekhon. 2011. ``Multivariate and Propensity Score Matching
## ##
       Software with Automated Balance Optimization: The Matching package for R.''
## ##
       Journal of Statistical Software, 42(7): 1-52.
## ##
library(Hmisc)
## Loading required package: lattice
## Loading required package: survival
## Loading required package: Formula
##
## Attaching package: 'Hmisc'
## The following objects are masked from 'package:dplyr':
##
##
      combine, src, summarize
## The following object is masked from 'package:gridExtra':
##
      combine
## The following objects are masked from 'package:base':
##
      format.pval, round.POSIXt, trunc.POSIXt, units
library(dplyr)
```

```
Write in 2005-2015 datasets
                                                                   hse05 = read dta("/Users/vincentmay/Desktop/Dissertation/Codes/dataset/hse05ai.dta")
write.csv(hse05, file = "hse05.csv")
hse06 = read_dta("/Users/vincentmay/Desktop/Dissertation/Codes/dataset/hse06ai.dta")
write.csv(hse06, file = "hse06.csv")
hse07 = read dta("/Users/vincentmay/Desktop/Dissertation/Codes/dataset/hse07ai.dta")
write.csv(hse07, file = "hse07.csv")
hse08 = read_dta("/Users/vincentmay/Desktop/Dissertation/Codes/dataset/hse08ai.dta")
write.csv(hse08, file = "hse08.csv")
hse09 = read_dta("/Users/vincentmay/Desktop/Dissertation/Codes/dataset/hse09ai.dta")
write.csv(hse09, file = "hse09.csv")
hse10 = read dta("/Users/vincentmay/Desktop/Dissertation/Codes/dataset/hse10ai.dta")
write.csv(hse10, file = "hse10.csv")
hse11 = read dta("/Users/vincentmay/Desktop/Dissertation/Codes/dataset/hse2011ai.dta")
write.csv(hse11, file = "hse11.csv")
hse12 = read_dta("/Users/vincentmay/Desktop/Dissertation/Codes/dataset/hse2012ai.dta")
write.csv(hse12, file = "hse12.csv")
hse13 = read_dta("/Users/vincentmay/Desktop/Dissertation/Codes/dataset/hse2013ai.dta")
write.csv(hse13, file = "hse13.csv")
hse14 = read_dta("/Users/vincentmay/Desktop/Dissertation/Codes/dataset/hse2014ai.dta")
write.csv(hse14, file = "hse14.csv")
hse15 = read_dta("/Users/vincentmay/Desktop/Dissertation/Codes/dataset/hse2015ai.dta")
write.csv(hse15, file = "hse15.csv")
Load CSV files
                                                                hse05 <-read.csv("hse05.csv")
hse06 <-read.csv("hse06.csv")
hse07 <-read.csv("hse07.csv")
hse08 <-read.csv("hse08.csv")
hse09 <-read.csv("hse09.csv")
hse10 <-read.csv("hse10.csv")
hse11 <-read.csv("hse11.csv")
hse12 <-read.csv("hse12.csv")
hse13 <-read.csv("hse13.csv")
hse14 <-read.csv("hse14.csv")</pre>
hse15 <-read.csv("hse15.csv")
```

#### Part 1/4: Data Preparation

```
###################
                                        Data Preparation -- Get variables needed
           In this section, variables in interest are selected.
          Children are filtered from the datasets by "age", which is further converted to three age gro
hse05.pc <- c("sys1om", "dias1om", "sex", "tenureb", "age", "ethinda", "hhsize", "addnum", "imd2004",
               "birthwt", "porftvg", "gor", "sys2om", "sys3om", "dias2om", "dias3om")
hse05.mk2 \leftarrow hse05[,hse05.pc]
colnames(hse05.mk2)[6] <- "origin"</pre>
colnames(hse05.mk2)[9] <- "imd"</pre>
hse05.mk2\$year <- 05
hse05.mk2\$aggr \leftarrow ifelse(hse05.mk2\$age > 10 & hse05.mk2\$age < 16, 3,
                           ifelse(hse05.mk2$age > 4 & hse05.mk2$age < 14, 2,
                                  ifelse(hse05.mk2$age > 1 & hse05.mk2$age < 5 , 1, 0)))</pre>
hse05.mk2$porftvg <- ifelse(hse05.mk2$porftvg > 5, 6, hse05.mk2$porftvg)
hse05.2 \leftarrow -c(which(hse05.mk2\$aggr == 0))
hse05.mk2 <- hse05.mk2[hse05.2,]
hse05.mk2$age <- NULL
hse06.pc <- c("sys1om", "dias1om", "sex", "tenureb", "age", "ethinda", "hhsize", "addnum", "imd2004",
               "birthwt", "porftvg", "gor06", "sys2om", "sys3om", "dias2om", "dias3om")
hse06.mk2 \leftarrow hse06[,hse06.pc]
colnames(hse06.mk2)[6] <- "origin"</pre>
colnames(hse06.mk2)[9] <- "imd"</pre>
colnames(hse06.mk2)[12] <- "gor"</pre>
hse06.mk2\$year <- 06
hse06.mk2$aggr <- ifelse(hse06.mk2$age > 10 & hse06.mk2$age < 16 , 3,
                           ifelse(hse06.mk2$age > 4 & hse06.mk2$age < 11 , 2,</pre>
                                  ifelse(hse06.mk2$age > 1 & hse06.mk2$age < 5 , 1, 0)))</pre>
hse06.mk2$porftvg <- ifelse(hse06.mk2$porftvg > 5, 6, hse06.mk2$porftvg)
hse06.2 \leftarrow -c(which(hse06.mk2\$aggr == 0))
hse06.mk2 <- hse06.mk2[hse06.2,]
hse06.mk2$age <- NULL
hse07.pc <- c("sys1om", "dias1om", "sex", "tenureb", "age", "ethinda", "hhsized", "addnum", "imd2007",
               "birthwt", "porftvg", "gor07", "sys2om", "sys3om", "dias2om", "dias3om")
hse07.mk2 \leftarrow hse07[,hse07.pc]
colnames(hse07.mk2)[6] <- "origin"</pre>
colnames(hse07.mk2)[7] <- "hhsize"</pre>
colnames(hse07.mk2)[9] <- "imd"</pre>
colnames(hse07.mk2)[12] <- "gor"</pre>
hse07.mk2\$year <- 07
hse07.mk2\$aggr \leftarrow ifelse(hse07.mk2\$age > 10 & hse07.mk2\$age < 16, 3,
                           ifelse(hse07.mk2\$age > 4 & hse07.mk2\$age < 11 , 2,
                                   ifelse(hse07.mk2$age > 1 & hse07.mk2$age < 5 , 1, 0)))</pre>
hse07.mk2$porftvg <- ifelse(hse07.mk2$porftvg > 5, 6, hse07.mk2$porftvg)
hse07.2 \leftarrow -c(which(hse07.mk2\$aggr == 0))
hse07.mk2 <- hse07.mk2[hse07.2,]
hse07.mk2$age <- NULL
```

```
hse08.pc <- c("sys1om", "dias1om", "sex", "tenureb", "age", "origin", "hhsize", "addnum", "qimd",
               "birthwt", "porftvg", "GOR", "sys2om", "sys3om", "dias2om", "dias3om")
hse08.mk2 <- hse08[,hse08.pc]
colnames(hse08.mk2)[9] <- "imd"</pre>
colnames(hse08.mk2)[12] <- "gor"</pre>
hse08.mk2\$year <- 08
hse08.mk2$aggr <- ifelse(hse08.mk2$age > 10 & hse08.mk2$age < 16, 3,
                           ifelse(hse08.mk2$age > 4 & hse08.mk2$age < 11, 2,
                                  ifelse(hse08.mk2\$age > 1 & hse08.mk2\$age < 5 , 1, 0)))
hse08.mk2$porftvg <- ifelse(hse08.mk2$porftvg > 5, 6, hse08.mk2$porftvg)
hse08.2 \leftarrow -c(which(hse08.mk2\$aggr == 0))
hse08.mk2 <- hse08.mk2[hse08.2,]
hse08.mk2$age <- NULL
hse09.pc <- c("sys1om", "dias1om", "sex", "tenureb", "age", "origin", "hhsize", "addnum", "IMD2007",
               "birthwt", "porftvg", "GORO7", "sys2om", "sys3om", "dias2om", "dias3om")
hse09.mk2 <- hse09[,hse09.pc]
colnames(hse09.mk2)[9] <- "imd"</pre>
colnames(hse09.mk2)[12] <- "gor"</pre>
hse09.mk2\$year <- 09
hse09.mk2$aggr <- ifelse(hse09.mk2$age > 10 & hse09.mk2$age < 16 , 3,
                           ifelse(hse09.mk2$age > 4 & hse09.mk2$age < 11 , 2,
                                  ifelse(hse09.mk2$age > 1 & hse09.mk2$age < 5 , 1, 0)))</pre>
hse09.mk2$porftvg <- ifelse(hse09.mk2$porftvg > 5, 6, hse09.mk2$porftvg)
hse09.2 \leftarrow -c(which(hse09.mk2\$aggr == 0))
hse09.mk2 <- hse09.mk2[hse09.2,]
hse09.mk2$age <- NULL
hse10.pc <- c("sys1om", "dias1om", "sex", "tenureb", "age", "origin", "hhsize", "addnum", "imd2007",
               "birthwt", "porftvg", "gor1", "sys2om", "sys3om", "dias2om", "dias3om")
hse10.mk2 <- hse10[,hse10.pc]
colnames(hse10.mk2)[9] <- "imd"</pre>
colnames(hse10.mk2)[12] <- "gor"</pre>
hse10.mk2\$year <- 10
hse10.mk2$aggr <- ifelse(hse10.mk2$age > 10 & hse10.mk2$age < 16, 3,
                           ifelse(hse10.mk2$age > 4 & hse10.mk2$age < 11 , 2,</pre>
                                  ifelse(hse10.mk2\$age > 1 & hse10.mk2\$age < 5 , 1, 0)))
hse10.mk2$porftvg <- ifelse(hse10.mk2$porftvg > 5, 6, hse10.mk2$porftvg)
hse10.2 \leftarrow -c(which(hse10.mk2\$aggr == 0))
hse10.mk2 <- hse10.mk2[hse10.2,]
hse10.mk2$age <- NULL
hse11.pc <- c("sys1om", "dias1om", "Sex", "tenureb", "Age", "Origin", "HHSize", "addnum", "qimd",
               "BirthWt", "porftvg", "gor1", "sys2om", "sys3om", "dias2om", "dias3om")
hse11.mk2 <- hse11[,hse11.pc]
colnames(hse11.mk2)[3] <- "sex"</pre>
colnames(hse11.mk2)[6] <- "origin"</pre>
colnames(hse11.mk2)[7] <- "hhsize"</pre>
colnames(hse11.mk2)[9] <- "imd"</pre>
```

```
colnames(hse11.mk2)[10] <- "birthwt"</pre>
colnames(hse11.mk2)[12] <- "gor"</pre>
hse11.mk2\$year <- 11
hse11.mk2$aggr <- ifelse(hse11.mk2$Age > 10 & hse11.mk2$Age < 16 , 3,
                            ifelse(hse11.mk2$Age > 4 & hse11.mk2$Age < 11 , 2,
                                   ifelse(hse11.mk2$Age > 1 & hse11.mk2$Age < 5 , 1, 0)))</pre>
hse11.mk2$porftvg <- ifelse(hse11.mk2$porftvg > 5, 6, hse11.mk2$porftvg)
hse11.2 \leftarrow -c(which(hse11.mk2\$aggr == 0))
hse11.mk2 <- hse11.mk2[hse11.2,]
hse11.mk2$Age <- NULL
hse12.pc <- c("sys1om", "dias1om", "Sex", "tenureb", "Age", "Origin", "HHSize", "Addnum", "qimd",
                                     "gor1", "sys2om", "sys3om", "dias2om", "dias3om")
               "BirthWt",
hse12.mk2 <- hse12[,hse12.pc]
colnames(hse12.mk2)[3] <- "sex"</pre>
colnames(hse12.mk2)[6] <- "origin"</pre>
colnames(hse12.mk2)[7] <- "hhsize"</pre>
colnames(hse12.mk2)[8] <- "addnum"</pre>
colnames(hse12.mk2)[9] <- "imd"</pre>
colnames(hse12.mk2)[10] <- "birthwt"</pre>
colnames(hse12.mk2)[11] <- "gor"</pre>
hse12.mk2$porftvg <- NA
hse12.mk2$year <- 12
hse12.mk2$aggr <- ifelse(hse12.mk2$Age > 10 & hse12.mk2$Age < 16, 3,
                           ifelse(hse12.mk2$Age > 4 & hse12.mk2$Age < 11 , 2,</pre>
                                   ifelse(hse12.mk2$Age > 1 & hse12.mk2$Age < 5 , 1, 0)))</pre>
hse12.mk2$porftvg <- ifelse(hse12.mk2$porftvg > 5, 6, hse12.mk2$porftvg)
hse12.2 \leftarrow -c(which(hse12.mk2\$aggr == 0))
hse12.mk2 <- hse12.mk2[hse12.2,]
hse12.mk2$Age <- NULL
hse13.pc <- c("SYS10M", "DIAS10M", "Sex", "tenureb", "Age", "Origin", "HHSize", "Addnum", "qimd",
               "BirthWt", "porftvg", "gor1", "SYS20M", "SYS30M", "DIAS20M", "DIAS30M")
hse13.mk2 <- hse13[,hse13.pc]
colnames(hse13.mk2)[1] <- "sys1om"</pre>
colnames(hse13.mk2)[2] <- "dias1om"</pre>
colnames(hse13.mk2)[3] <- "sex"</pre>
colnames(hse13.mk2)[6] <- "origin"</pre>
colnames(hse13.mk2)[7] <- "hhsize"</pre>
colnames(hse13.mk2)[8] <- "addnum"</pre>
colnames(hse13.mk2)[9] <- "imd"</pre>
colnames(hse13.mk2)[10] <- "birthwt"</pre>
colnames(hse13.mk2)[12] <- "gor"</pre>
colnames(hse13.mk2)[13] <- "sys2om"</pre>
colnames(hse13.mk2)[14] <- "sys3om"</pre>
colnames(hse13.mk2)[15] <- "dias2om"</pre>
colnames(hse13.mk2)[16] <- "dias3om"</pre>
hse13.mk2\$year <- 13
hse13.mk2$aggr <- ifelse(hse13.mk2$Age > 10 & hse13.mk2$Age < 16 , 3,
                            ifelse(hse13.mk2$Age > 4 & hse13.mk2$Age < 11 , 2,</pre>
                                   ifelse(hse13.mk2$Age > 1 & hse13.mk2$Age < 5 , 1, 0)))</pre>
```

```
hse13.mk2$porftvg <- ifelse(hse13.mk2$porftvg > 5, 6, hse13.mk2$porftvg)
hse13.2 \leftarrow -c(which(hse13.mk2\$aggr == 0))
hse13.mk2 <- hse13.mk2[hse13.2,]
hse13.mk2$Age <- NULL
hse14.pc <- c("SYS10M","DIAS10M","Sex","tenureb","Age90","origin2","HHSize9","Addnum","qimd",
               "BirthWt", "PorFV05", "gor1", "SYS20M", "SYS30M", "DIAS20M", "DIAS30M")
hse14.mk2 <- hse14[,hse14.pc]
colnames(hse14.mk2)[1] <- "sys1om"</pre>
colnames(hse14.mk2)[2] <- "dias1om"</pre>
colnames(hse14.mk2)[3] <- "sex"</pre>
colnames(hse14.mk2)[6] <- "origin"</pre>
colnames(hse14.mk2)[7] <- "hhsize"</pre>
colnames(hse14.mk2)[8] <- "addnum"</pre>
colnames(hse14.mk2)[9] <- "imd"</pre>
colnames(hse14.mk2)[10] <- "birthwt"</pre>
colnames(hse14.mk2)[11] <- "porftvg"</pre>
colnames(hse14.mk2)[12] <- "gor"</pre>
colnames(hse14.mk2)[13] <- "sys2om"</pre>
colnames(hse14.mk2)[14] <- "sys3om"</pre>
colnames(hse14.mk2)[15] <- "dias2om"</pre>
colnames(hse14.mk2)[16] <- "dias3om"</pre>
hse14.mk2\$year <- 14
hse14.mk2$aggr <- ifelse(hse14.mk2$Age90 > 10 & hse14.mk2$Age90 < 16 , 3,
                            ifelse(hse14.mk2$Age90 > 4 & hse14.mk2$Age90 < 11 , 2,
                                   ifelse(hse14.mk2$Age90 > 1 & hse14.mk2$Age90 < 5 , 1, 0)))
hse14.2 \leftarrow -c(which(hse14.mk2\$aggr == 0))
hse14.mk2 <- hse14.mk2[hse14.2,]
hse14.mk2$Age90 <- NULL
hse15.pc <- c("SYS10M", "DIAS10M", "Sex", "tenureb", "Ag015g4", "origin2", "HHSize6", "addnum", "qimd",
               "BirthWt", "PorFV05b", "Gor1", "SYS20M", "SYS30M", "DIAS20M", "DIAS30M")
hse15.mk2 <- hse15[,hse15.pc]
colnames(hse15.mk2)[1] <- "sys1om"</pre>
colnames(hse15.mk2)[2] <- "dias1om"</pre>
colnames(hse15.mk2)[3] <- "sex"</pre>
colnames(hse15.mk2)[6] <- "origin"</pre>
colnames(hse15.mk2)[7] <- "hhsize"</pre>
colnames(hse15.mk2)[9] <- "imd"</pre>
colnames(hse15.mk2)[10] <- "birthwt"</pre>
colnames(hse15.mk2)[11] <- "porftvg"</pre>
colnames(hse15.mk2)[12] <- "gor"</pre>
colnames(hse15.mk2)[13] <- "sys2om"</pre>
colnames(hse15.mk2)[14] <- "sys3om"</pre>
colnames(hse15.mk2)[15] <- "dias2om"</pre>
colnames(hse15.mk2)[16] <- "dias3om"</pre>
hse15.mk2\$year <- 15
hse15.mk2$aggr <- ifelse(hse15.mk2$Ag015g4 > 0, hse15.mk2$Ag015g4, 0)
hse15.2 \leftarrow -c(which(hse15.mk2\$aggr == 0))
hse15.mk2 <- hse15.mk2[hse15.2,]
hse15.mk2$Ag015g4 <- NULL
```

```
Data Preparation -- Merge (Row bind) the datasets
                                                                                            ########
hse.mk20 <- rbind(hse05.mk2, hse06.mk2)
hse.mk20 <- rbind(hse.mk20, hse07.mk2)
hse.mk20 <- rbind(hse.mk20, hse08.mk2)
hse.mk20 <- rbind(hse.mk20, hse09.mk2)
hse.mk20 <- rbind(hse.mk20, hse10.mk2)
hse.mk20 <- rbind(hse.mk20, hse11.mk2)
hse.mk20 <- rbind(hse.mk20, hse12.mk2)
hse.mk20 <- rbind(hse.mk20, hse13.mk2)
hse.mk20 <- rbind(hse.mk20, hse14.mk2)
hse.mk20 <- rbind(hse.mk20, hse15.mk2)
############
                 Data Preparation -- Convert the inapplicable cases to NAs & Keep only the valid BP
       As some of the observations are recorded as negative number or huge number in inapplicable case
       This step ensures those cases are marked as NAs rather than continuous number
colnames(hse.mk20)
## [1] "sys1om" "dias1om" "sex"
                                     "tenureb" "origin"
                                                                  "addnum"
                                                         "hhsize"
                 "birthwt" "porftvg" "gor"
   [8] "imd"
                                               "sys2om"
                                                        "sys3om" "dias2om"
## [15] "dias3om" "year"
                           "aggr"
range(hse.mk20$sex)
## [1] 1 2
range(hse.mk20$tenureb)
## [1] -9 6
range(hse.mk20$origin)
## [1] -9 18
range(hse.mk20$hhsize)
## [1] 2 12
range(hse.mk20$addnum)
## [1] 1 56
range(hse.mk20$imd)
## [1] 1 5
range(hse.mk20$birthwt, na.rm = T)
## [1] -1.00 7.14
range(hse.mk20$porftvg, na.rm = T)
## [1] -9 6
range(hse.mk20$gor)
## [1] 1 9
```

```
range(hse.mk20$year)
## [1] 5 15
range(hse.mk20$aggr)
## [1] 1 3
range(hse.mk20$sys1om)
## [1] -9 186
range(hse.mk20$sys2om)
## [1] -9 996
range(hse.mk20$sys3om)
## [1] -9 194
range(hse.mk20$dias1om)
## [1] -9 131
range(hse.mk20$dias2om)
## [1] -9 135
range(hse.mk20$dias3om)
## [1] -9 140
# tenureb, origin, birthwt, porftvg, & six BP measurements has negative values (inapplicable cases)
# birthwt, porftvg has NA values originally which require to be imputed later.
        Covert the inapplicable cases to NAs
hse.mk20$tenureb <- ifelse(hse.mk20$tenureb < 0, NA, hse.mk20$tenureb)
hse.mk20$origin <- ifelse(hse.mk20$origin < 0, NA, hse.mk20$origin)
hse.mk20$birthwt <- ifelse(hse.mk20$birthwt < 0, NA, hse.mk20$birthwt)
hse.mk20$porftvg <- ifelse(hse.mk20$porftvg < 0, NA, hse.mk20$porftvg)
#
       Keep only the valid measurements
#
       Note: As children age from 2-4 does not have valid BP measurements, so they are dropped from the
hse.mk20.pc \leftarrow -c(which(hse.mk20\$sys1om < 0 \mid hse.mk20\$sys1om > 200 \mid
                         \label{localization} $$ hse.mk20\$sys2om > 0 \mid hse.mk20\$sys2om > 200 \mid $$
                         hse.mk20$sys3om < 0 | hse.mk20$sys3om > 200 |
                         hse.mk20$dias1om < 0 | hse.mk20$dias1om > 200 |
                         hse.mk20$dias2om < 0 | hse.mk20$dias2om > 200 |
                         hse.mk20$dias3om < 0 | hse.mk20$dias3om > 200))
hse.mk20 <- hse.mk20[hse.mk20.pc,]
      Last check
colnames(hse.mk20)
                  "dias1om" "sex"
                                       "tenureb" "origin"
## [1] "sys1om"
                                                            "hhsize"
                                                                       "addnum"
## [8] "imd"
                   "birthwt" "porftvg" "gor"
                                                  "sys2om"
                                                            "sys3om"
                                                                       "dias2om"
```

```
## [15] "dias3om" "year"
                            "aggr"
range(hse.mk20$sex)
## [1] 1 2
range(hse.mk20$tenureb, na.rm = T)
## [1] 1 6
range(hse.mk20$origin, na.rm = T)
## [1] 1 18
range(hse.mk20$hhsize)
## [1] 2 11
range(hse.mk20$addnum)
## [1] 1 56
range(hse.mk20$imd)
## [1] 1 5
range(hse.mk20$birthwt, na.rm = T)
## [1] 0.91 6.75
range(hse.mk20$porftvg, na.rm = T)
## [1] 0 6
range(hse.mk20$gor)
## [1] 1 9
range(hse.mk20$year)
## [1] 5 15
range(hse.mk20$aggr)
## [1] 2 3
range(hse.mk20$sys1om, na.rm = T)
## [1] 51 183
range(hse.mk20$sys2om, na.rm = T)
## [1] 52 187
range(hse.mk20$sys3om, na.rm = T)
## [1] 53 194
range(hse.mk20$dias1om, na.rm = T)
## [1] 31 131
range(hse.mk20$dias2om, na.rm = T)
## [1] 31 135
```

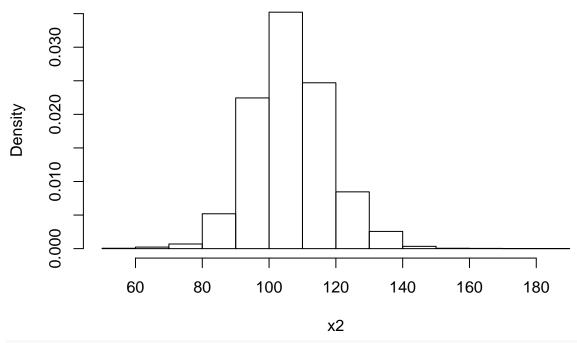
```
range(hse.mk20$dias3om, na.rm = T)
## [1] 30 140
##################################
                                     Data Preparation -- Average the BP for each row
        Looking into the distribution of BP measurements
x1 <- hse.mk20$sys1om
range(hse.mk20$sys1om, na.rm = T)
## [1] 51 183
hist(x1, freq = FALSE)
                                     Histogram of x1
     0.010
                                                       140
                 60
                          80
                                    100
                                                                 160
                                                                           180
                                              120
                                              x1
x2 \leftarrow hse.mk20$sys2om
range(hse.mk20$sys2om, na.rm = T)
```

##########

## [1] 52 187

hist(x2, freq = FALSE)

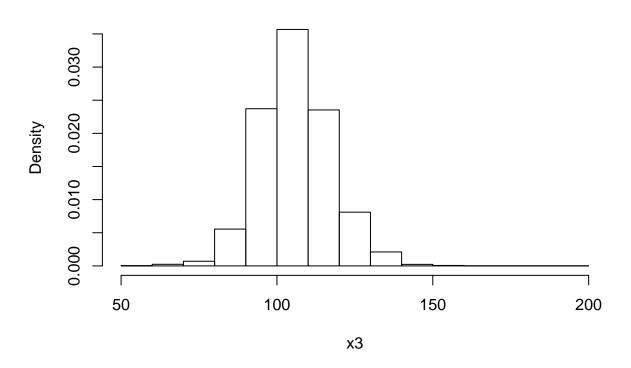
### Histogram of x2



```
x3 <- hse.mk20$sys3om
range(hse.mk20$sys3om, na.rm = T)</pre>
```

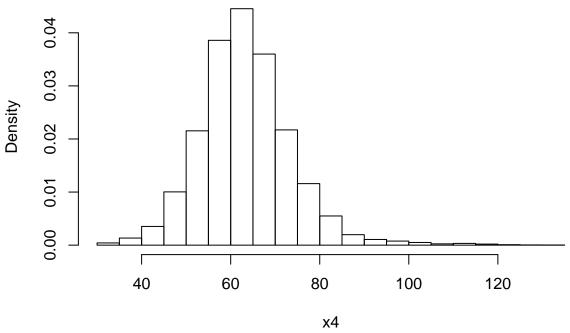
## [1] 53 194
hist(x3, freq = FALSE)

## Histogram of x3



```
x4 <- hse.mk20$dias1om
range(hse.mk20$dias1om, na.rm = T)
## [1] 31 131
hist(x4, freq = FALSE)</pre>
```

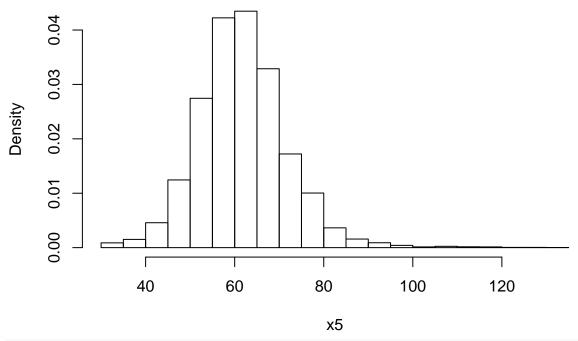
### Histogram of x4



```
x5 <- hse.mk20$dias2om
range(hse.mk20$dias2om, na.rm = T)
```

## [1] 31 135
hist(x5, freq = FALSE)

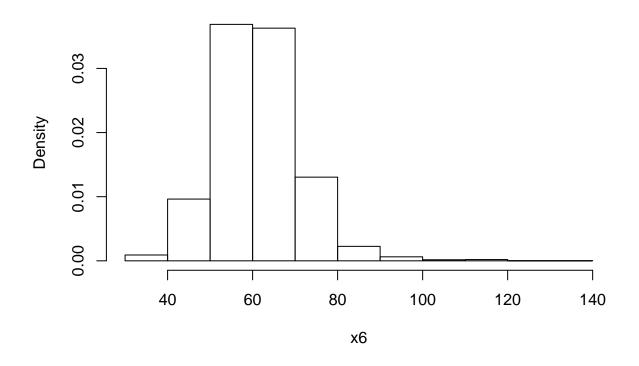
### Histogram of x5



```
x6 <- hse.mk20$dias3om
range(hse.mk20$dias3om, na.rm = T)
```

## [1] 30 140
hist(x6, freq = FALSE)

# Histogram of x6



```
Get the average of the diastolic and systolic measurements for each row
hse.mk20$sysavg <- NA
hse.mk20$diaavg <- NA
for ( i in 1 : dim(hse.mk20)[1] ) {
      \label{localization} $$ hse.mk20\$sys2om[i] + hse.mk20\$sys2om[i] + hse.mk20\$sys3om[i]) / 3$ 
      hse.mk20\$diaavg[i] \leftarrow (hse.mk20\$dias1om[i] + hse.mk20\$dias2om[i] + hse.mk20\$dias3om[i]) / 3
}
hse.mk20$sys1om <- NULL
hse.mk20$sys2om <- NULL
hse.mk20$sys3om <- NULL
hse.mk20$dias1om <- NULL
hse.mk20$dias2om <- NULL
hse.mk20$dias3om <- NULL
###################################
                                   Data Preparation -- Get the hypertensive group
                                                                                           #############
   Calculate .95 quantiles of the systolic and diastolic bp for each of the three age groups,
   if the child's systolic / diastolic bp is higher than .95 age group's threshold,
   the child is classified as hypertensive
# systolic bp comparison for age group 2
hse.mk20$sys.hyper2 <- NA
hse.mk20$sys.hyper2 <- ifelse(hse.mk20$aggr == 2, hse.mk20$sysavg, NA)
range(hse.mk20$sys.hyper2, na.rm = T)
## [1] 66.33333 148.33333
quantile(hse.mk20$sys.hyper2, .95, na.rm = T)
##
        95%
## 120.6667
hse.mk20$sys.hyper2.mk <- NA
hse.mk20$sys.hyper2.mk <- ifelse(hse.mk20$sys.hyper2 >= quantile(hse.mk20$sys.hyper2, .95, na.rm = T)[1]
length(which(hse.mk20$sys.hyper2.mk == 1 ))
## [1] 240
                                group 3
hse.mk20$sys.hyper3 <- NA
hse.mk20$sys.hyper3 <- ifelse(hse.mk20$aggr == 3, hse.mk20$sysavg, NA)
range(hse.mk20$sys.hyper3, na.rm = T)
## [1] 66 186
quantile(hse.mk20$sys.hyper3, .95, na.rm = T)
##
        95%
## 129.6667
hse.mk20$sys.hyper3.mk <- NA
hse.mk20$sys.hyper3.mk <- ifelse(hse.mk20$sys.hyper3 >= quantile(hse.mk20$sys.hyper3, .95, na.rm = T)[1]
length(which(hse.mk20$sys.hyper3.mk == 1 ))
## [1] 225
```

```
# diastolic bp comparison for age group 2
hse.mk20$dia.hyper2 <- NA
hse.mk20$dia.hyper2 <- ifelse(hse.mk20$aggr == 2, hse.mk20$diaavg, NA)
range(hse.mk20$dia.hyper2, na.rm = T)
## [1] 34.66667 102.00000
quantile(hse.mk20$dia.hyper2, .95, na.rm = T)
        95%
## 77.33333
hse.mk20$dia.hyper2.mk <- NA
hse.mk20$dia.hyper2.mk <- ifelse(hse.mk20$dia.hyper2 >= quantile(hse.mk20$dia.hyper2, .95, na.rm = T)[1]
length(which(hse.mk20$dia.hyper2.mk == 1 ))
## [1] 247
                                group 3
hse.mk20$dia.hyper3 <- NA
hse.mk20$dia.hyper3 <- ifelse(hse.mk20$aggr == 3, hse.mk20$diaavg, NA)
range(hse.mk20$dia.hyper3, na.rm = T)
## [1] 35.66667 114.33333
quantile(hse.mk20$dia.hyper3, .95, na.rm = T)
## 95%
## 77
hse.mk20$dia.hyper3.mk <- NA
hse.mk20$dia.hyper3.mk <- ifelse(hse.mk20$dia.hyper3 >= quantile(hse.mk20$dia.hyper3, .95, na.rm = T)[1]
length(which(hse.mk20$dia.hyper3.mk == 1 ))
## [1] 229
        Get the hypertensive group
    if the child is classified as hypertensive by one of the age groups'threshold
   then the child is hypertensive
hse.mk20$sys.hyper2.mk <- ifelse(is.na(hse.mk20$sys.hyper2.mk), 0, hse.mk20$sys.hyper2.mk)
hse.mk20$sys.hyper3.mk <- ifelse(is.na(hse.mk20$sys.hyper3.mk), 0, hse.mk20$sys.hyper3.mk)
hse.mk20$dia.hyper2.mk <- ifelse(is.na(hse.mk20$dia.hyper2.mk), 0, hse.mk20$dia.hyper2.mk)
hse.mk20$dia.hyper3.mk <- ifelse(is.na(hse.mk20$dia.hyper3.mk), 0, hse.mk20$dia.hyper3.mk)
hse.mk20$hyper <- NA
hse.mk20$hyper <- ifelse(hse.mk20$sys.hyper2.mk == 1 | hse.mk20$sys.hyper3.mk == 1
                       | hse.mk20$dia.hyper2.mk == 1 | hse.mk20$dia.hyper3.mk == 1 ,1, 0)
length(which(hse.mk20$hyper == 1 ))
## [1] 781
       Delete used rows
hse.mk20$sys.hyper2 <- NULL
hse.mk20$sys.hyper2.mk <- NULL
hse.mk20$sys.hyper3 <- NULL
hse.mk20$sys.hyper3.mk <- NULL
```

```
hse.mk20$dia.hyper2 <- NULL
hse.mk20$dia.hyper2.mk <- NULL
hse.mk20$dia.hyper3 <- NULL
hse.mk20$dia.hyper3.mk <- NULL
#################################
                                    Data Preparation -- Multiple Imputation
                                                                                   ##########################
hse.mk50 \leftarrow hse.mk20
# Multiple imputation
set.seed(1)
hse.mk50.mi <- aregImpute(~ hyper + sex + tenureb + origin + hhsize + addnum + imd + birthwt +
                             porftvg + gor + aggr + year + sysavg + diaavg, data = hse.mk50, n.impute =
## Iteration 1
Iteration 2
Iteration 3
Iteration 4
Iteration 5
Iteration 6
Iteration 7
Iteration 8
Iteration 9
Iteration 10
Iteration 11
Iteration 12
Iteration 13
Iteration 14
Iteration 15
Iteration 16
Iteration 17
Iteration 18
Iteration 19
Iteration 20
Iteration 21
Iteration 22
Iteration 23
Iteration 24
Iteration 25
Iteration 26
Iteration 27
Iteration 28
Iteration 29
Iteration 30
Iteration 31
Iteration 32
Iteration 33
Iteration 34
Iteration 35
Iteration 36
Iteration 37
Iteration 38
Iteration 39
```

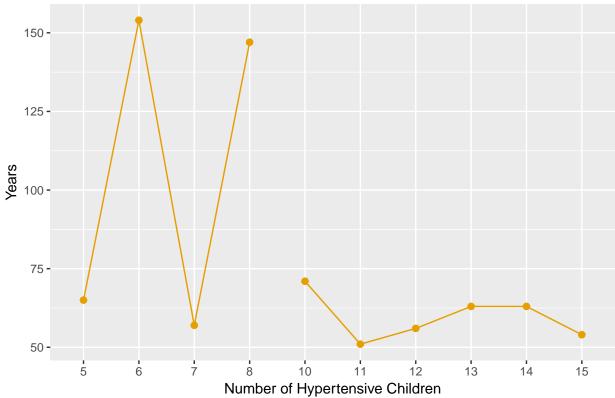
Iteration 40

```
Iteration 41
Iteration 42
Iteration 43
Iteration 44
Iteration 45
Iteration 46
Iteration 47
Iteration 48
Iteration 49
Iteration 50
Iteration 51
Iteration 52
Iteration 53
# Retrieve the imputed values
hse.mk50.mi.r <- impute.transcan(hse.mk50.mi, data = hse.mk50, imputation=1, list.out=TRUE, pr=FALSE, ci
# Arrange the columns accordingly
hse.mk60 \leftarrow hse.mk50
hse.mk60$tenureb <- hse.mk50.mi.r$tenureb
hse.mk60$origin <- hse.mk50.mi.r$origin
hse.mk60$birthwt <- hse.mk50.mi.r$birthwt
hse.mk60$porftvg <- hse.mk50.mi.r$porftvg
                     Data Preparation -- Subset the hypertensive group for the clustering analysis
###################
        hse.mk60 is the dataset for all children with regardless of whether they are hypertensive or no
        hse.mk85 contains only the hypertensive children
hse.mk60.pc \leftarrow -c(which(hse.mk60$hyper == 0))
hse.mk85 <- hse.mk60[hse.mk60.pc,]
hse.mk85$hyper <- NULL
hse.mk85$sysavg <- NULL
hse.mk85$diaavg <- NULL
hse.mk85$sysavg <- NULL
hse.mk85$diaavg <- NULL
```

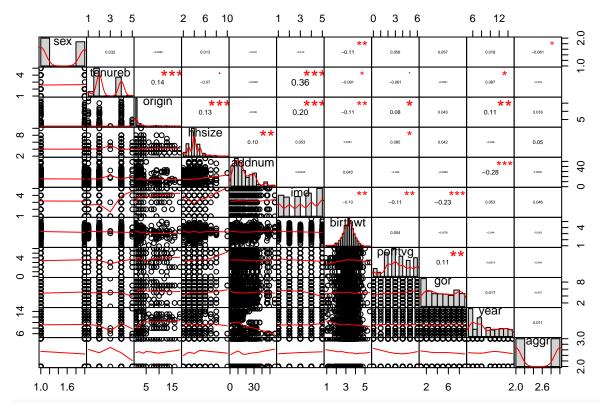
#### Part 2/4: Current Hypertension Phenomenon Plotting



# Number of Hypertensive Children across Years



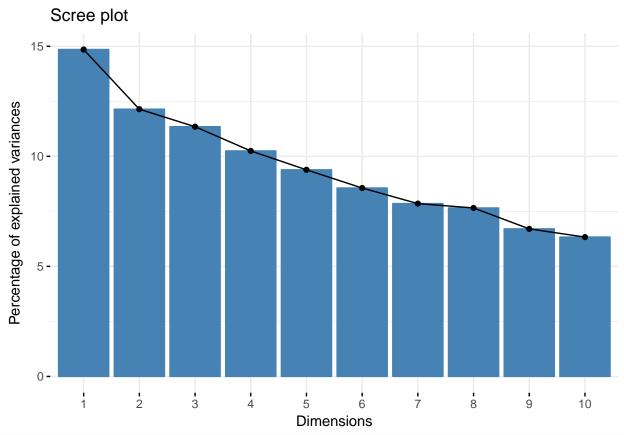
Part 3/4: Principal Components Analysis (PCA) & Correspondence analysis (CORA)



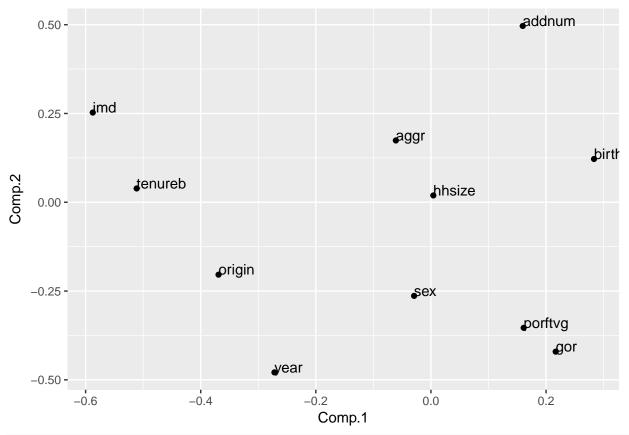
# and the correlation matrix:
cor(hse.mk85)

```
##
                          tenureb
                                      origin
                                                  hhsize
                                                               addnum
                  sex
                      ## sex
          1.000000000
## tenureb 0.032417927 1.000000000 0.138691314 -0.070010414 -0.0099494051
         -0.008604396 0.138691314 1.000000000 0.125300694 -0.0356240083
## origin
                                             1.00000000 0.1019075663
## hhsize
          0.013400676 -0.070010414 0.125300694
## addnum
         -0.016255513 -0.009949405 -0.035624008 0.101907566 1.0000000000
## imd
          -0.011701401 0.360434975 0.199830386 0.053353413 0.0004755454
## birthwt -0.110554645 -0.090559327 -0.110419365
                                             0.006704787
                                                         0.0425466873
## porftvg 0.057974983 -0.060507403 0.080352101 0.085146930 -0.0257302882
## gor
          0.057357270 - 0.009123849 \ 0.042795023 \ 0.041744105 - 0.0067576125
## year
          -0.080776257 -0.043188987 0.015528203 0.050358235
                                                         0.0093275242
## aggr
##
                   imd
                           birthwt
                                      porftvg
                                                      gor
          -0.0117014008 -0.110554645 0.057974983 0.057357270
                                                          0.017830535
## sex
## tenureb 0.3604349751 -0.090559327 -0.060507403 -0.009123849
                                                          0.086812986
          0.1998303857 -0.110419365 0.080352101 0.042795023
## origin
                                                          0.112924233
## hhsize
          0.0533534132 \quad 0.006704787 \quad 0.085146930 \quad 0.041744105 \quad -0.025591251
## addnum
          1.0000000000 -0.103795819 -0.109717956 -0.234176752 0.053088789
## imd
## birthwt -0.1037958194 1.000000000 0.054341549 -0.007760230 -0.043703547
## porftvg -0.1097179565 0.054341549 1.000000000 0.107895548 -0.001402858
## gor
          -0.2341767523 -0.007760230 0.107895548 1.000000000
                                                         0.016672702
          0.0530887892 -0.043703547 -0.001402858 0.016672702
## year
                                                         1.000000000
          0.0456080353 -0.041830433 -0.044178573 -0.046981949 0.011454565
## aggr
##
                 aggr
## sex
         -0.080776257
## tenureb -0.043188987
```

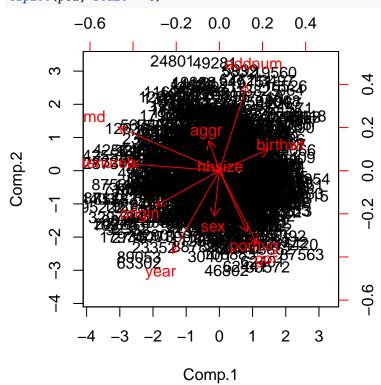
```
## origin
          0.015528203
## hhsize 0.050358235
## addnum 0.009327524
## imd
           0.045608035
## birthwt -0.041830433
## porftvg -0.044178573
## gor
          -0.046981949
## year
           0.011454565
## aggr
           1.000000000
Principal Components Analysis (PCA)
                                                                                 ######################
# The eigen values (explained variances) and the scree plot:
pca <- princomp(na.omit(hse.mk85), cor = T, scores = TRUE)</pre>
summary(pca)
## Importance of components:
                            Comp.1
                                      Comp.2
                                                Comp.3
                                                         Comp.4
                                                                    Comp.5
## Standard deviation
                         1.2782534 1.1556594 1.1172116 1.0615910 1.01619180
## Proportion of Variance 0.1485392 0.1214135 0.1134693 0.1024523 0.09387689
## Cumulative Proportion 0.1485392 0.2699528 0.3834220 0.4858743 0.57975120
                                        Comp.7
                                                   Comp.8
##
                             Comp.6
                                                             Comp.9
## Standard deviation
                         0.97038590 0.92937644 0.91757061 0.8587035
## Proportion of Variance 0.08560444 0.07852187 0.07653962 0.0670338
## Cumulative Proportion 0.66535564 0.74387751 0.82041713 0.8874509
##
                            Comp.10
                                      Comp.11
## Standard deviation
                         0.83451462 0.73595187
## Proportion of Variance 0.06331042 0.04923865
## Cumulative Proportion 0.95076135 1.00000000
fviz_eig(pca)
```



```
# Overall, it seems that we'll need two or three components to account for the variation in the data.
# Variables' contribution to the principal components
pca.df <- data.frame(pca$loadings[,1:2])
ggplot(pca.df,aes(x = Comp.1, y = Comp.2)) + geom_point() + geom_text(aes(label=rownames(pca.df)),hjust</pre>
```



# # Dimension Reduction biplot(pca, scale = 0)



```
prediction <- data.frame(predict(pca))</pre>
ggplot(prediction,aes(x = Comp.1, y = Comp.2)) + geom_point() + geom_text(aes(label=rownames(prediction
                                     24801
                                                    49281
    2 -
Comp.2
                     79724715230002901
   -2 -
                               23352
                                                                                  87563
                                                        46802<sup>62441</sup>62401
                                                                            2
                              -2
                                                     Ö
       -4
                                            Comp.1
Correspondence Analysis (CORA)
                                                                               ############################
cora <- ca(na.omit(hse.mk85))</pre>
summary(cora)
##
## Principal inertias (eigenvalues):
##
##
    dim
           value
                      %
                          cum%
                                  scree plot
##
           0.115351
                     45.5
                          45.5
##
    2
           0.055700
                     22.0
                           67.4
           0.027461
##
                     10.8
##
           0.016668
                      6.6
                           84.8
           0.015196
##
    5
                           90.8
##
    6
           0.007862
                      3.1
                           93.9
##
           0.006129
                      2.4
                           96.3
           0.003720
                           97.8
##
    8
                      1.5
##
    9
           0.003405
                      1.3 99.1
                      0.9 100.0
           0.002193
##
```

## ##

## ## ## Rows:

Total: 0.253686 100.0

##	name	mass	qlt	inr	k=1	cor	ctr	k=2	cor	ctr	
## 1	152	1	389	1	-312	301	1	-169	88	0	
## 2	303	1	125	1	99	65	0	-95	60	0	
## 3	609	1	72	1	40	10	0	-98	62	0	
## 4	754	1	641	1	339	632	1	-39	8	0	1
## 5	994	1	50	1	-132	47	0	-37	4	0	
## 6	1082	2	410	1	217	368	1	-74	43	0	
## 7	1507	1	459	1	244	448	1	-39	11	0	1
## 8	1567	1	389	1	210	381	0	-30	8	0	1
## 9	1702	1	313	0	176	305	0	-30	9	0	1
## 10	2004	1	463	0	208	448	0	-38	15	0	1
## 11	2545	1	130	1	-89	55	0	-104	75	0	1
## 12	2752	1	401	1	235	386	1	-46	15	0	1
## 13	2910	1	142	1	-133	90	0	-102	53	0	1
## 14	2944	1	671	1	377	670	1	15	1	0	
## 15	2984	2	467	1	220	449	1	-44	18	0	
## 16	l 3064 l	1	168	1	167	160	0	-36	8	0	1
## 17	3212	1	291	0	74	79	0	120	211	0	
## 18	3303	1	106	1	116	91	0	-48	15	0	
## 19	3594	1	493	1	140	159	0	203	334	1	
## 20	4022	1	155	1	163	150	0	-30	5	0	1
## 21	l 4062 l	1	524	1	254	523	1	l 6	0	0	1
## 22	4268	1	187	1	-196	140	0	-113	46	0	1
## 23	4388	1	544	2	-533	480	2	-196	65	0	1
## 24	4446	1	63	1	118	59	0	-28	3	0	1
## 25	4573	1	534	1	256	530	1	-25	5	0	1
## 26	4887	1	272	0	159	232	0	l -67	41	0	1
## 27	4927	1	486	0	227	478	0	-30	8	0	1
## 28	5614	1	703	1	310	701	1	-15	2	0	1
## 29	5709	1	150	1	l <b>-</b> 96	42	0	-154	108	0	1
## 30	5818	1	631	2	-539	562	2	-189	69	1	1
## 31	5855	1	321	1	221	321	0	-8	0	0	1
## 32	5992	1	768	1	325	764	1	-25	4	0	1
## 33	6128	1	644	1	336	641	1	-21	3	0	1
## 34	l 6634 l	1	343	1	211	308	0	-72	35	0	1
## 35	6821	1	273	1	152	221	0	-74	52	0	1
## 36	7012	1	352	1	185	300	0	-77	52	0	1
## 37	7073	1	634	0	242	621	1	-36	14	0	1
## 38	7615	1	451	1	-309	378	1	-136	73	0	1
## 39	8065	1	523	2	-556	441	2	-240	82	1	
## 40	8715	1	316	1	-190	201	0	-144	115	0	
## 41	8730	1	783	1	305	779	1	-24	5	0	
## 42	9048	1	578	1	328	578	1	6	0	0	1
## 43	9138	1	452	1	254	437	1	-47	15	0	
## 44	9483	1	294	1	171	276	0	-44	18	0	1
## 45	9543	1	270	0	146	242	0	-50	29	0	
## 46	9662	1	386	2	-351	282	1		104	1	
## 47	9764	1	90	1	75	47	0	-71	43	0	
## 48	9788	1	258	1	193	255	0	-21	3	0	1
## 49	9958	1	156	1	l -91	44	0	-145	112	0	1
## 50	1030	1	276	1	165	237	0	l -67	38	0	1
## 51	1080	1	310	0	171	290	0	-45	20	0	
## 52	11376	1	652	1		652	2	l -6	0	0	
## 53	11377	1	763	1	409	763	2	9	0	0	

##	54	1141	1	461	2	-412	458	2	32	3	0	l
##	55	1169	1	349	1	283 3	347	1	20	2	0	١
##	56	11946	1	270	1	-213	162	0	-173	107	1	١
##	57	1201	1	303	1	-283 2	256	1	-120	47	0	
##	58	12034	1	250	1	-206	158	0	-157	92	0	
##	59	12264	1	282	1	-205	185	0	-149	98	0	١
##	60	1232	1	408	0	210 4	407	0	-9	1	0	١
##	61	1251	1	748	0	258	748	1	-6	0	0	١
##	62	1264	1	545	2	-541	456	2	-239	89	1	
##	63	1286	1	641	2	-544 5	561	2	-206	80	1	
##	64	1297	2	434	1	194 3	319	0	117	115	0	
##	65	1312	1	210	1	156 2	201	0	-34	9	0	
##	66	146	2	915	3	565 8	880	6	112	35	1	
##	67	274	1	126	1	-28	6	0	-120	119	0	
##	68	328	1	124	1	-18	2	0	-130	122	0	
##	69	351	2	744	2	442	738	3	-38	5	0	
##	70	387	2	890	3	591 8	890	6	6	0	0	
##	71	6221	2	919	3	588 9	917	6	29	2	0	
##	72	6512	1	614	1	-418 6	610	1	-33	4	0	
##	73	7241	1	802	1	307 8	301	1	-11	1	0	
##	74	825	2	752	1	330	749	2	-21	3	0	
##	75	l 920 l	1	159	0	-16	3	0	-119	156	0	
##	76	964	2	971	3	674 9		7	47	5	0	
##	77	1078	1	360	1	-456 3		1	-109	19	0	
##	78	1179	1	165	1	-80	42	0	-137	122	0	
##	79	1424	1	103	1	1	0	0	-111	103	0	
##	80	1463	2	884	2	415 8		3	121	69	0	
##	81	1749	1	74	1		4	0	112	70	0	!
##	82	1867	1	110	1	30	7	0	-121	104	0	!
##	83	1912	2	560	1	326 5		1	104	51	0	!
##	84	1935	2	185	1		157	0	62	28	0	!
##	85	1936	2	189	1		158	0	68	31	0	
##	86	1946	2	771	1		708	2	100	63	0	
##	87	2054	2	784	2		783	3	-10	0	0	
##	88	2138	1	679	1	295 6		1	-23	4	0	  -
##	89	2302	2	881	2	469 8		3	18	1	0	 
##		2480	2	896	4	662 8		7	68	9	0	 
##	91 92	2506		781	1			2		6 57		 
## ##	93	2513     2626	2 2	712 871	1			2   5	103 -1	57 0	0	l I
	93 94	2020     2668	2	927	3			6	72	13		 
	9 <del>4</del> 95	2000	1	343	1	-294 2		1	-174	89		l I
	96	2729	1	107	0	294 2   -5	0	0 1	-99	107	0	l I
##	97	2750	1	693	0			1	-31	107		i I
##	98	2784	1	630	1			1	-29	4		i I
##	99	2796	1	424	1			0 1	-141	146		i
##		2819	1	158	0		91	0 1	-77	67		i
##	101	3091	1	631	2			2		110		i
##	102	3259	1	124	0		8	0 1		116		i
##	103	3492	2	785	2			3	12	1		i I
##	104	3519	1	466	1			1	-152	94		i
##	105	3812	1	461	1	-329 3		1		127		i
##	106	4020	1	298	1	155 2		0 1	-80	62		İ
##	107			906	2			4	112	46	0	İ

##	108	l 4233	l 1	455	1 I	-318	333	1	-192	122	1	ı
##		4234	l 1	319	1 I	-277		1	-157	78	0	¦ 
##	110	4341	l 1	552	2 I	-502		2	-221	89	1	! !
					:				•			1
##	111	4448	1	215	1	225		0	18	1	0	1
##	112	4928	2	966	4	701		9	65	8	0	!
##	113	4942	1	660	1	-359		1	-140	86	0	!
##	114	5126	2	690	1	306		1	109	78	0	!
##	115	5411	1	132	1	-68	43	0	-98	89	0	
##	116	5690	2	931	3	617		6	19	1	0	1
##	117	5832	1 2	961	3	637	954	6	56	7	0	ı
##	118	l 5936	1	882	1	422		2	15	1	0	ı
##	119	5999	1 2	977	4	692	971	9	54	6	0	ı
##	120	l 6103	1	67	1	16	2	0	-87	65	0	
##	121	6157	1	274	0	79	136	0	-80	138	0	
##	122	6430	2	846	1	405	846	2	-2	0	0	
##	123	6662	1	856	1	469	856	3	6	0	0	
##	124	7001	1	52	1	54	19	0	-71	33	0	
##	125	l 7366	1 2	922	2	495	872	5	118	50	1	
##	126	7561	1 2	952	3	642	947	7	48	5	0	
##	127	7562	1 2	953	3	613	950	6	38	4	0	
##	128	l 7989	1	495	1	241	493	1	-16	2	0	
##	129	l 7990	1	496	1	259	496	1	-7	0	0	
##	130	l 7992	1	653	1	337	653	1	-7	0	0	
##	131	7997	1	841	1	432	838	2	25	3	0	Ι
##	132	l 8051	1	427	1	-389	384	1	-130	43	0	Ι
##	133	8198	1	417	1	-239	346	0	-108	71	0	I
##	134	8801	2	704	1	293	457	1	216	248	1	Ī
##	135	8819	1	100	1	114	69	0	-76	31	0	I
##	136	8936	1	377	1	-344	314	1	-154	63	0	I
##	137	l 8990	1	521	1	-363	474	1	-114	47	0	ĺ
##	138	9008	1	901	2	509	899	3	23	2	0	ĺ
##	139	9111	l 2	714	1 I	368	714	2	l 2	0	0	İ
##	140	9404	l 2	900	3 I	624	896	6	44	4	0	İ
##	141	9718	l 1	500	2 I	-522		2	17	0	0	İ
##	142	9802	 I 1	309	 0 l	-109	142	0	-118	166	0	i
##	143	10056	 l 2	729	1		716	2	52	13	0	i
##	144	10118	. – I 2	925	 5 l	747		10	59	6	0	i
##	145			785	2			3	26	2	_	i
##		1066	   1	162	0		52	0	96	110	0	i
##	147			872	3			5	4	0	0	i
##	148			617	1			1	-173	100	0	i
##	149		1 2	750	1	313		1	111	84	0	i
##	150		1	100	1		25	0	131	75	0	i I
##	151	12267	2	906	3			6	44	4	0	i
##	152	12425	1	509	1			1	20	2	0	i
##	153	12420		482	2	-413		1	-227	112	1	i
##	154			8	1	-40	6	0	-23	2	0	i
##	155		1	29	1	48	13	0	-52	16	0	¦
##	156	13119	1	512	2			2	-52	32	0	ı
##				652						3		! !
##	158	1344   13497	1	937	1   4			1 8	23 62	3 7	0	I I
								3	62			I I
	159	•	•	851	•					5 12	0	I I
	160	•	•	955	4			9	88		0	I I
##	161	1391	1	132	0	106	118	0	-36	14	0	ı

##	162	l 1395	1 2	618	1	366	605	2	-56	14	0	ı
##	163	1399	. – I 2	852	3 I			6	31	2	0	i
##	164	14251	l 1	409	1	-354	376	1	-104	32	0	i
##	165	14410	l 1	64	1	-16	2	0	-85	61	0	i
##	166	14411	l 1	69	0 1	5	0	0	-73	69	0	i
##	167	l 1447	 l 1	57	0 1	21	6	0	-63	51	0	i
##	168	14537	 l 1	218	0 1	-87	107	0	-88	111	0	i
##	169	14538	 l 1	240	0 1	-108	130	0	-99	110	0	i
##	170	1467	 I 2	925	3 I	632		6	61	8	0	i
##	171	1472	. – I 1	414	1	236		1	-71	35	0	i
##	172	l 1481	 l 1	37	 0 l		3	0	48	34	0	i
##	173	1482	1	58	0 1		6	0	51	52	0	i
##	174	1505	1	87	1	33	6	0	-120	81	0	i
##	175	1506	1 2	718	2			3	-27	3	0	i
##	176	1515	1 2	977	4 1			8	164	55	1	i
##	177	1538	1 2	721	1		714	2	-39	7	0	i
##	178	15569	1 2	784	2	461		3	-27	3	0	i
##	179	l 15733	. <u>-</u>	215	0 1		47	0	118	167	0	i
##	180	1575	, <u> </u>	513	1 1	-366		1	-184	104	0	i
##	181	1587	1 2	954	3	645		7	30	2	0	i
##	182	1649	l 2	913	2	444		3	-7	0	0	i
##	183	1652	. <u>-</u>	843	2	553		4	32	3	0	i
##	184	1667	1 1	238	0 1	-138		0	-73	52	0	i
##	185	1692	1 1	435	1 1	-303		1	-201	133	1	i
##	186	1715	1 1	526	1 1	-283		1	-155	121	0	i
##	187	17331	1 1	38	1 1	83	38	0	-12	1	0	i
##	188	1745	1 1	93	0 1	-33	14	0	-80	79	0	i
##	189	17522	1 2	906	3 1		726	4	234	179	2	i
##	190	17522	1 2	929	3	483	743	4	241	186	2	i
##	191	1765	1 1	137	0 1	51	45	0	-73	92	0	i
##	192	1771	1 2	950	3	606		6	39	4	0	i
##	193	1781	1 1	318	1		231	0	-129	87	0	i
##	194	l 1786	1 1	183	1 1	157	182	0	-14	1	0	i
##	195	1795   1795	1 2	902	3	533		5	16	1	0	i
##	196	l 1803	1 1	208	1		207	0	-14	1	0	i
##	197	1806	, <u> </u>	469	1 1		395	0	-109	74	0	i
##	198	l 1838	1 1	404	2	-476		1	-125	26	0	i
##	199			797	2			3		5	_	i
	200			160	1		20	0				i
	201			96	1		7	0		89		i
	202			713	1			2	8	0		i
	203	1919	1	313		-284		1	-129	54		i
	204	1931	1	126	1		11	0		115		i
	205		2	952	3			6	32	3		i
	206			559		-250		0	-121	106		i
	207		. – I 2	970	5 I			10	76	9		i
	208		. –   1	554		-370		1	37	5		i
	209		1	304		-362		1	-112	26		i
	210			120	1		28	0		92		i
	211	2016	1	362	2			1		41		i
	212	2042	1	322	1		92	0		230		i
	213			592	1			1	-41	11		i
	214			917	1			3	8	0		i
	215			924	2			3		1		i
					- '	J-1		Ü		-	•	•

```
## 216 | 21120 |
                       1
                          461
                                  1 | -332 346
                                                   1 | -191 115
                                                                    1 |
## 217 | 21121 |
                          430
                                  1 | -327 329
                                                   1 | -181 101
                                                                    1 I
                       1
## 218 |
            2123
                       1
                          374
                                  1 | -198 295
                                                   0 | 102
                                                              78
                                                                    0 1
## 219 |
            2124 |
                       2
                          869
                                  3 |
                                        533 805
                                                   5 |
                                                        151
                                                              65
                                                                    1 I
## 220 |
             233
                       1
                          288
                                  1 |
                                       175 214
                                                   0 |
                                                        102
                                                              73
                                                                    0 1
## 221 |
             436 |
                                       140 136
                                                          67
                       1
                          166
                                  1 |
                                                   0 |
                                                              30
                                                                    0 1
## 222 |
                                  1 | -430 512
            4926 l
                       1
                          513
                                                   2 |
                                                        -19
                                                               1
                                                                    0 1
## 223 l
                                        209 479
                                                        -46
            8851 |
                       1
                          503
                                  0 |
                                                   1 |
                                                              23
                                                                    0 1
## 224 l
           10851 |
                       1
                          442
                                  1 | -174 265
                                                   0 | -142 177
                                                                    0 |
                                       438 757
## 225 |
            1282 |
                       2
                          758
                                  2 |
                                                   3 |
                                                          16
                                                               1
                                                                    0 |
## 226 |
            1635 |
                       1
                           68
                                  0 |
                                       -69 35
                                                   0 |
                                                        -67
                                                              33
                                                                    0 |
## 227 |
                                  1 | -153 112
                                                   0 | -128
                                                              77
            1731 |
                       1
                          189
                                                                    0 |
## 228 I
            2484
                          509
                                  1 | -263 392
                                                   1 l
                                                         144 117
                                                                    0 1
                       1
## 229 |
            2632
                       2
                                                         -9
                          811
                                  1 |
                                        403 810
                                                   2 |
                                                               0
                                                                    0 |
## 230 |
                                  1 | -438 538
                                                   2 |
                                                         -69
                                                                    0 1
            3196 |
                       1
                          551
                                                              13
## 231 |
            4416 |
                       1
                          594
                                  1 |
                                        248 584
                                                   1 |
                                                         -33
                                                              11
                                                                    0 |
## 232 |
                                  1 l
                                        273 748
                                                        -26
                                                               7
            4563 |
                          755
                                                   1 |
                                                                    0 1
                       1
## 233 |
            4600 l
                          166
                                  0 |
                                        61
                                             52
                                                   0 |
                                                        -90 114
                       1
                                                                    0 1
## 234 |
                          731
                                  1 | -396 634
                                                   1 | -155
            4626
                                                              97
                                                                    0 1
                       1
## 235 l
            4698
                 - 1
                       1
                          214
                                  0 |
                                       -16
                                              7
                                                   0
                                                     - 1
                                                          88 207
                                                                    0 1
## 236 I
            4857 |
                       1
                          150
                                  1 | -103
                                            85
                                                   0 |
                                                        -91
                                                              66
                                                                    0 |
## 237 |
                          846
                                        372 846
                                                   2 |
                                                           1
            4976
                       1
                                  1 |
                                                                    0 1
## 238 |
                                  0 |
                                        247 845
                                                        -42
            5163 |
                          870
                                                   1 |
                                                              25
                                                                    0 |
                       1
## 239 I
                                  0 |
                                        95 111
                                                   0 |
                                                        -93 107
            5184 l
                       1
                          218
                                                                    0 1
## 240 |
                                  1 | -169 135
            5274
                       1
                          264
                                                   0 | -165 129
                                                                    1 I
## 241 |
            5473 I
                       1
                          404
                                  1 | -201 245
                                                   0 | -162 159
                                                                    1 I
## 242 |
            5894 |
                                  1 | -272 381
                                                        236 285
                       1
                          666
                                                   1 |
                                                                    1 |
                                       176 341
## 243 |
            6248 |
                       1
                          405
                                  1 |
                                                   0 |
                                                        -76
                                                              64
                                                                    0 |
## 244 |
                          555
                                  2 | -427 451
                                                   2 | -205 103
            6358 |
                       1
                                                                    1 |
## 245 |
            6467
                          662
                                  1 |
                                        293 662
                                                   1 |
                                                          -4
                                                               0
                                                                    0 |
                       1
## 246 |
            6472
                       2
                          757
                                  1 |
                                        406 757
                                                   2 |
                                                           6
                                                               0
                                                                    0 |
## 247 |
            6801 |
                       1
                          351
                                  1 | -185 192
                                                   0 | -168 158
                                                                    1 I
## 248 |
            6878 |
                       2
                          957
                                  1 |
                                       407 956
                                                   2 |
                                                        -11
                                                                    0 |
## 249 |
                                         48 37
                                                        -88 122
            7039 |
                          158
                                  0 |
                                                   0 |
                                                                    0 |
                       1
## 250 |
            7185
                 - 1
                       1
                          230
                                  1 | -135
                                            90
                                                   0 | -167 140
                                                                    1
                                  1 | -139 102
## 251 |
                          123
                                                        -63
            7411 |
                       1
                                                   0 |
                                                              21
                                                                    0 1
## 252 l
            7534 l
                       1
                          630
                                  1 | -413 544
                                                   1 | -164
                                                                    0 1
## 253 l
                          482
                                  1 |
                                        207 452
                                                   1 |
                                                        -53
                                                              30
                                                                    0 |
            7655
                       1
## 254 |
            7656
                          466
                                  0 |
                                        193 423
                                                   0 |
                                                        -61
                                                              43
                                                                    0 |
                       1
                                        305 889
## 255 |
                          896
                                                        -28
                                                               8
            7659 |
                                  1 |
                                                   1 |
                                                                    0 1
                       1
## 256 |
                                                   0 | -100
            7952 |
                       1
                           64
                                  1 |
                                        11
                                              1
                                                              63
                                                                    0 |
## 257 l
            8310 |
                          488
                                        317 474
                                                   1 |
                                                        -54
                       1
                                  1 |
                                                              14
                                                                    0 1
                                        372 655
## 258
       - 1
            8316 l
                       2
                          666
                                  1 l
                                                   2 |
                                                        -49
                                                              11
                                                                    0 1
                                                        -98 119
## 259 |
           95021 |
                          153
                                  0 |
                                        -52
                                             34
                                                   0 |
                                                                    0 |
                       1
## 260 |
            9748
                       1
                          598
                                  1 |
                                        291 571
                                                   1 |
                                                         -62
                                                              26
                                                                    0 |
## 261 |
            9754 |
                          665
                                        331 649
                                                         -52
                                                                    0 |
                       1
                                  1 |
                                                   1 |
                                                              16
## 262 |
           10510
                       1
                           30
                                  1 |
                                         29
                                               5
                                                   0 |
                                                         -64
                                                              25
                                                                    0 |
                                                          85
## 263 |
            1067
                       1
                          375
                                  0 | -162 295
                                                   0 |
                                                              80
                                                                    0 |
## 264 |
          10749
                          559
                                  1 |
                                        343 559
                                                   1 |
                                                           6
                                                               0
                                                                    0 1
                       1
## 265 |
            1097 |
                       1
                          705
                                  1 |
                                        375 704
                                                   1 |
                                                          15
                                                               1
                                                                    0 |
                                  1 | -156 126
                          277
## 266 |
          11984 |
                                                   0 | -171 151
                       1
                                                                    1 l
## 267 |
          12037
                       1
                          554
                                  1 | -282 432
                                                   1 |
                                                        150 122
                                                                    0 |
## 268 I
            1272
                          519
                                  1 | -399 465
                                                   1 | -137
                                                              54
                                                                    0 |
                       1
## 269 |
                                       323 862
            1292 |
                       1
                          902
                                  1 |
                                                   1 |
                                                         70
                                                             40
                                                                    0 |
```

```
## 270 |
            1296 |
                       1
                          238
                                  0 |
                                       56 66
                                                   0 | -90 173
                                                                   0 |
## 271 |
            1325 |
                          775
                                  2 | 491 773
                                                   3 I
                                                         26
                                                               2
                                                                   0 1
                       1
## 272 |
            1331
                          494
                                  2 | -439 463
                                                   2 | -112
                                                              30
                                                                   0 1
                                  1 | -104
                                                  0 | -138 119
## 273 |
           13473 |
                                            68
                       1
                          188
                                                                   0 1
## 274 |
            1389
                       1
                          181
                                  1 | -198 141
                                                  0 | -105
                                                              40
                                                                   0 1
## 275 |
           14053 |
                                                       -26
                       1
                           81
                                  1 |
                                      116
                                            77
                                                   0 |
                                                               4
                                                                   0 1
                                  1 | -389 353
                                                   1 | -122
## 276 l
            1432 l
                       1
                          388
                                                              35
                                                                   0 1
## 277 |
                                                   0 | -124 215
            5433
                       1
                          217
                                  0 |
                                        14
                                              3
                                                                   0 1
## 278 I
             111 l
                       1
                          810
                                  2 | -596 716
                                                   3 I
                                                        216
                                                              94
                                                                   1 I
                                  1 | -161 86
                                                       -51
## 279 |
            4185 |
                       1
                           94
                                                   0 |
                                                               9
                                                                   0 |
## 280 |
             533 |
                          544
                                  2 | -510 473
                                                   2 | -198
                                                             71
                                                                   1 |
                       1
## 281 |
             585 |
                       2
                                       352 748
                                                        -51
                          764
                                  1 |
                                                   2 |
                                                              16
                                                                   0 |
## 282 I
            1060
                          442
                                  1 | -234 273
                                                   0 | -184 169
                       1
                                                                   1 l
            1252 |
## 283 |
                       1
                          373
                                  0 |
                                       119 253
                                                   0 |
                                                        -82 120
                                                                   0 |
## 284 |
            1440 |
                          520
                                       -98
                                             68
                                                        253 452
                       1
                                  1 |
                                                   0 |
                                                                   1 l
## 285 |
            1444 |
                       2
                          899
                                  2 |
                                       107
                                             31
                                                   0 |
                                                        568 868
                                                                   9 |
## 286 |
           15732 |
                                       -24
                                                        -44
                                                                   0 |
                                              2
                                                   0 |
                                                               9
                       1
                           11
                                  1 l
## 287 |
            1625
                       2
                          561
                                       221 561
                                                         -5
                                                               0
                                                                   0 |
                                  1 |
                                                   1 l
## 288 I
                          679
                                       299 661
            1994 |
                       2
                                  1 l
                                                        -49
                                                              18
                                                                   0 1
                                                   1 l
## 289 I
            2596
                       1
                          372
                                  1 l
                                       250 348
                                                   1 |
                                                        -65
                                                              24
                                                                   0 1
## 290 I
            2710 |
                       2
                          832
                                  1 I
                                       420 831
                                                   2 |
                                                         14
                                                               1
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## 291 |
                       2
                          843
                                       399 843
                                                   2 |
                                                          4
                                                               0
            2711
                                  1 |
                                                                   0 |
## 292 |
                                  1 | -227 236
                                                   0 | -177 143
            3046 |
                          379
                                                                   1 |
                       1
## 293 l
                       2
                                         36
                                                        662 968
            3466 l
                          971
                                  3 I
                                              3
                                                   0 |
                                                                  15 I
                                                   0 |
                                                        669 965
## 294 |
            3467
                       2
                          969
                                  4 |
                                         40
                                              3
                                                                  16 l
## 295 l
            3513 I
                       2
                          913
                                  1 l
                                       409 913
                                                   2 |
                                                         -5
                                                               0
                                                                   0 |
## 296 |
            3839 |
                          792
                                       398 792
                                                   2 |
                                                          2
                                                               0
                                                                   0 |
                       1
                                  1 |
                                        79
                                                        -57
## 297 |
            3932 |
                       1
                          134
                                  0 |
                                             88
                                                   0 |
                                                              46
                                                                   0 |
## 298 |
            4196 |
                          925
                                  2 | -171
                                             83
                                                        546 843
                       1
                                                   0 |
                                                                   8 |
## 299 |
            4715
                       2
                          862
                                  1 |
                                       339 850
                                                   2 |
                                                        -40
                                                              12
                                                                   0 |
## 300 |
            4781
                       1
                          746
                                  2 | -556 736
                                                   3 |
                                                         66
                                                              10
                                                                   0 |
## 301 |
            5108 |
                       1
                          698
                                  1 | -501 610
                                                   2 | -190
                                                              88
                                                                   1 I
                                  2 | -518 520
                                                   2 | -235 107
## 302 |
            5191 |
                       1
                          627
                                                                   1 l
## 303 |
            5469 |
                                  0 |
                                        52 34
                                                        -66
                                                             55
                           90
                                                   0 |
                                                                   0 |
                       1
## 304 |
           55311
                          866
                                  2 | -203 108
                                                   0 |
                                                        537 757
                                                                   6 |
                       1
## 305 l
                                  5 | -723 414
            5636
                       1
                          934
                                                  5 I
                                                        811 521
                                                                  13 l
## 306 l
            6110
                       1
                          187
                                  0 |
                                        36
                                            29
                                                   0 |
                                                        -83 158
## 307 l
            6363 |
                          200
                                  1 | -185 156
                                                   0 |
                                                        -98
                                                                   0 |
                       1
                                                              44
## 308 |
            6394
                           82
                                  0 |
                                       -36
                                                   0 |
                                                        -76
                                                              67
                       1
                                            15
                                                                   0 |
                                  1 | -143 160
## 309 |
            6456 |
                          360
                                                   0 | -160 200
                                                                   1 |
                       1
## 310 |
                                       -15
                                                        -86
            6561
                       1
                           45
                                  1 |
                                              1
                                                   0 |
                                                              44
                                                                   0 |
## 311 |
          66012
                       2
                          712
                                  0 |
                                       225 664
                                                        -61
                                                   1 |
                                                              48
                                                                   0 1
## 312 |
            6746
                       1
                          616
                                  2 | -511 562
                                                   2 | -158
                                                              54
                                                                   0 1
                                                        -38
## 313 |
            6830 |
                          762
                                       340 753
                                                              10
                                                                   0 |
                       1
                                  1 |
                                                   1 |
                                       354 818
                                                          0
## 314 |
            6856 |
                       1
                          818
                                  1 |
                                                   1 |
                                                               0
                                                                   0 |
## 315 |
                                                        290 434
            6974 |
                                  1 |
                                      142 104
                                                   0 |
                                                                   2 |
                       1
                          538
                                                         34
## 316 |
            7024 |
                       1
                          207
                                  1 | -161 198
                                                   0 |
                                                               9
                                                                   0 |
                                       309 792
                                                       -38
## 317 |
          72653
                       1
                          804
                                  1 |
                                                   1 |
                                                             12
                                                                   0 |
## 318 |
            7495
                          510
                                  1 | -268 363
                                                   1 | -171 147
                                                                   1 I
                       1
## 319 |
            7712 |
                       1
                          408
                                  1 | -200 227
                                                   0 | -179 182
                                                                   1 l
                                                   0 | -105 239
## 320 |
                          323
                                       -63
                                            84
            7875 |
                       1
                                  0 |
                                                                   0 |
## 321 |
            8044
                       1
                          130
                                  1 | -149
                                            88
                                                   0 | -103 42
                                                                   0 |
## 322 l
            8071 I
                          742
                                  1 |
                                       375 741
                                                   2 | -12
                                                                   0 |
                       1
                                                               1
## 323 |
                                                  0 | -111 147
            8464 |
                       1
                          151
                                  0 |
                                       -19
                                              4
                                                                   0 1
```

```
## 324 |
           8571 |
                      1
                          722
                                 1 |
                                       292 716
                                                  1 |
                                                       -26
                                                                  0 |
                                                              6
## 325 l
                       2
                          740
                                       391 732
                                                  2 |
                                                       -40
                                                                  0 1
           9273 I
                                 1 |
                                                              8
## 326 l
           9407
                       1
                          102
                                 0 |
                                       -31 13
                                                  0 |
                                                       -81
                                                             88
                                                                  0 1
                                       404 844
## 327 |
           9581 |
                       2
                          844
                                  1 |
                                                  2 |
                                                         0
                                                              0
                                                                  0 |
## 328
       - 1
           9585
                      2
                          910
                                 1 |
                                       462 910
                                                  3 |
                                                         5
                                                              0
                                                                  0
## 329 |
                      2
                                 7 | -393 142
                                                  2 | 940 812
           9814 |
                          954
                                                                 26 |
                                 0 I -63
                                                  0 | -105 148
## 330 l
           9984 I
                       1
                          202
                                           53
                                                                  0 1
                                 1 | -209 187
                                                  0 | -160 109
## 331 |
          10003
                       1
                          296
                                                                  0 1
## 332 l
          10004 l
                      1
                          353
                                 1 | -214 226
                                                  0 | -161 127
                                                                  0 |
## 333 |
          10115 |
                       2
                          643
                                 1 | 324 618
                                                  2 | -66
                                                            26
                                                                  0 |
## 334 |
           1081
                          497
                                  0 | -197 337
                                                  0 | -135 160
                                                                  0 |
                       1
## 335 |
          10823 |
                                 2 | -169 101
                                                       450 719
                       1
                          821
                                                  0 |
                                                                  5 |
## 336 l
           1106
                          616
                                 0 | -211 413
                                                  0 | -148 203
                                                                  0 1
                      1
          11988 |
                       2
                                                       -31
## 337 |
                          775
                                  1 |
                                       361 770
                                                  2 |
                                                              6
                                                                  0 |
## 338 |
          12087 |
                                 1 |
                                       378 583
                                                  2 |
                                                        16
                                                                  0 |
                       1
                          584
                                                              1
## 339 |
          12092 |
                       2
                          816
                                 1 |
                                       410 815
                                                  2 |
                                                         7
                                                              0
                                                                  0 |
## 340 |
                       2
                          876
                                       393 876
                                                  2 |
                                                        -7
           1225 |
                                 1 |
                                                              0
                                                                  0 1
## 341 |
          12420
                          411
                                  1 | -130 174
                                                  0 | -152 237
                       1
                                                                  1 l
## 342 l
                                                  0 | 555 866
           1245
                       2
                          879
                                 3 I
                                        66
                                            12
                                                                 11 l
## 343 l
           1248
                       2
                          860
                                 3 I
                                        61
                                             8
                                                  0 |
                                                       613 851
                                                                 13
## 344 l
            1260 |
                      1
                           39
                                  1 I
                                         2
                                             0
                                                  0 |
                                                       -76
                                                            39
                                                                  0 1
## 345 |
                                       -50
                                                  0 | -126 135
            1284
                       1
                          156
                                  1 |
                                            21
                                                                  0 1
## 346 |
                                                       810 882
           1287
                       2
                          884
                                 5 |
                                        39
                                             2
                                                  0 |
                                                                 20 |
## 347 l
          13106 l
                      2
                                                  2 |
                                                       -27
                          728
                                 2 |
                                       431 725
                                                              3
                                                                  0 |
                                                  0 |
## 348 |
           1315 |
                       2
                          928
                                 3 I
                                       111
                                            30
                                                       609 898
                                                                 13 l
## 349 l
           1317 I
                       2
                          657
                                 1 l
                                       364 646
                                                  2 |
                                                       -47
                                                             11
                                                                  0 |
## 350 |
           1318 |
                                        14
                                             2
                                                  0 | -136 157
                       1
                          159
                                  1 |
                                                                  0 1
                                       387 740
## 351 |
           1326
                      1
                          742
                                 1 |
                                                  2 |
                                                       -16
                                                              1
                                                                  0 |
## 352 |
                          857
                                       301 841
                                                       -42
           1339 |
                       1
                                  1 |
                                                  1 |
                                                            16
                                                                  0 1
## 353 |
          13476
                          432
                                 1 | -211 323
                                                  0 | -123 109
                                                                  0 |
                       1
## 354 |
          13490
                       2
                          779
                                  1 |
                                       293 772
                                                  1 |
                                                       -28
                                                              7
                                                                  0 |
## 355 |
          13781 |
                       1
                          922
                                  6 | -446 191
                                                  2 |
                                                       873 731
                                                                 19 |
                                  6 | -446 183
## 356 |
          13782 |
                       1
                          929
                                                  2 |
                                                       902 746
                                                                 20 I
## 357 |
           1396 |
                           84
                                  1 |
                                       98 68
                                                  0 | -48
                                                            16
                                                                  0 |
                       1
## 358 |
           1401
                      1
                          629
                                  2 | -528 519
                                                  2 | -242 109
                                                                  1 l
                                                  0 | -136 170
## 359 l
                                 0 | -206 392
           1420
                      1
                          562
                                                                  0 1
## 360 l
          14254
                       1
                          551
                                 1 | -218 352
                                                  0 | -163 199
                                                                  0 1
## 361 l
            1428 |
                       2
                          918
                                 2 | 128 73
                                                  0 | 434 845
                                                                  7 |
## 362 |
           1437
                          814
                                 2 | 579 804
                                                  4 |
                                                        65
                       1
                                                            10
                                                                  0 |
## 363 |
                          639
                                 2 | -574 510
                                                  3 | -288 128
           1442 |
                                                                  1 |
                       1
                                 3 | -390 238
                                                  1 | 588 540
## 364 |
            1461
                      1
                          778
                                                                  7 |
## 365 |
            1465 |
                          720
                                 2 | -573 608
                                                  3 | -246 112
                       1
                                                                  1 |
                                      423 940
## 366 l
            1471 l
                      2
                          941
                                 1 |
                                                  2 |
                                                       -14
                                                              1
                                                                  0 1
## 367 |
            1474 |
                          700
                                  2 | -527 573
                                                  2 | -248 127
                       1
                                                                  1 l
                                 0 | -106 173
                                                  0 | -123 233
## 368 |
            1483
                       1
                          406
                                                                  0 |
## 369 |
                                  1 |
                                        56
                                           23
                                                  0 | -44
            1512 |
                       1
                           38
                                                            15
                                                                  0 |
                                                  0 | -106
## 370 |
            1519
                      1
                          346
                                  1 | -189 263
                                                             83
                                                                  0 |
## 371 |
                                       324 756
                                                       -54
            1530 |
                       2
                          777
                                  1 |
                                                  2 |
                                                             21
                                                                  0 |
## 372 |
            1554
                       1
                          238
                                  0 1
                                        90
                                           91
                                                  0 | -113 146
                                                                  0 1
## 373 |
           15567
                 -
                       1
                          622
                                  1 |
                                       290 621
                                                  1 |
                                                       -11
                                                              1
                                                                  0 |
## 374 |
                                       368 841
                                                        -6
            1569 |
                          841
                                                  2 |
                                                              0
                                                                  0 1
                      1
                                  1 l
## 375 |
            1571
                       1
                          142
                                 0 |
                                        57
                                            38
                                                  0 |
                                                       -96 105
                                                                  0 |
## 376 l
            1578 |
                       2
                          915
                                 2 | -185
                                           86
                                                  0 |
                                                       573 828
                                                                  9 |
## 377 |
            1581 |
                          593
                                  1 |
                                       285 575
                                                  1 |
                                                       -51 18
                                                                  0 1
```

<b>##</b> 270	1 1506		CAE	0 1	-583	E30	2 1	070	115	4	
	1586	1	645	2			3	-272		1	1
	1640	1	722	2	-571		2	-214	89	1	!
	1650	2	792	1		780	2	-43	12	0	!
## 381	1669	2	536	1	223		1	-72	51	0	1
## 382	1681	1	853	2	-156	86	0		767	6	I
## 383	1683	2	514	1	212	429	1	-94	85	0	ı
## 384	1687	1	837	1	349	832	2	-29	6	0	
## 385	1707	1	157	0	3	0	0	-98	157	0	
## 386	1710	1	827	2	-565	712	3	-228	116	1	
## 387	1712	2	764	1	406	763	2	-14	1	0	
## 388	17332	1	370	0	148	308	0	-66	62	0	I
## 389	1736	2	668	1	395	666	2	-18	1	0	I
## 390	1753	1	197	1	97	85	0	-111	112	0	ı
## 391	1788	1	885	1	333	879	1	-26	5	0	İ
## 392	1792	2	669	1		669	2	7	0	0	i
## 393	18154	1	784	1 i		783	1	9	1	0	i
## 394	18155	1	793	1		793	1	3	0	0	i
## 395	1 1817	1	304	0 1		178	0 1	-97	126	0	i
## 396	1880	1	311	1 1		217	1	-155	94	0	i
## 397	1 18942	2	849	1	404		2	9	0	0	<u>'</u>
## 398	18977	1	172	0 1	<del>4</del> 04     -60	39	0 1	-110	133	0	<u> </u>
	18977		110		-60   -40			-110 -97		0	1
	•	1		0		16	0		94	-	1
## 400	1900	1	672	1	391		2	-16	1	0	1
## 401	1929	1	933	7	701		5	932		20	1
## 402	2037	1	745	1	374		2	4	0	0	!
## 403	2040	2	916	1	317		1	-41	15	0	!
## 404	2074	1	194	0		148	0	-70	46	0	!
## 405	2081	1	825	1		707	2	-208	118	1	
## 406	2095	2	780	1		770	2	-39	10	0	ı
## 407	2133	2	726	1		726	2	-5	0	0	l
## 408	2136	2	845	1		760	1	95	85	0	ı
## 409	2140	2	704	1	327	678	2	-64	26	0	
## 410	2157	1	818	2	497	817	3	14	1	0	
## 411	2161	1	39	1	-21	4	0	-66	35	0	
## 412	21718	1	594	1	-500	533	2	-168	60	0	
## 413	21719	1	634	1	-498	579	2	-153	55	0	
## 414	2173	1	86	0	81	66	0	-44	20	0	
## 415	2187	1	832	3 I	-239	102	1	639	730	10	1
## 416	2196	1	738	2	451	738	3	5	0	0	Ι
## 417	22127	1	656	0	-240	562	1	98	94	0	Ι
## 418		1	627	0	-247	550	1	92	76	0	I
## 419		1	699	2	-528		2	-226	108	1	ĺ
## 420		1	753		-526		2	-233	123	1	İ
## 421	2216	_	765	1			2		10		i
## 422	2225	_	424	1			1	-96	70		i
## 423	2254		551		-507		2		45		i
## 424			581		-212		0				i
## 425	2904		650	1			1	97	59		İ
## 426	4081	1	350	1			0 1		123		i I
## 427	4761	2	589	1			1	80	72		İ
## 427 ## 428	4701	2	578	1			1	85	75		l
## 420 ## 429		_	676	1			2		20		l I
## 429 ## 430			878	1		34	0			5	I I
											1
## 431	1191	1	575	1	359	5/4	2	19	2	0	

##	432	1417	1	950	8 I	-509 186	3	1032	765	28	ı
##	433	1458	1	596	1	-230 379	1	174	218	1	İ
##	434	1518	1	313	1	163 221	0	-106	92	0	ĺ
##	435	2062	2	839	1	344 826	2	-44	13	0	١
##	436	2069	1	932	4	-730 498	4	683	435	8	١
##	437	2270	1	548	2	-525 488	2	-184	60	1	
##	438	2555	2	894	3	35 3	0	645	892	13	
##	439	2593	1	690	1	-367 520	1	-209	169	1	
##	440	2691	1	582	2	-536 500	2	-218	82	1	
##	441	3068	1	759	1	-355 573	1	-203	187	1	
##	442	3290	1	380	1	-304 328	1	-122	53	0	
##	443	3574	1	450	1	261 430	1	-56	20	0	
##	444	3673	2	786	1	395 778	2	-40	8	0	
##	445	3744	1	644	2	-412 485	2	-236	159	1	
##	446	4041	2	732	2	410 732	3	7	0	0	
##	447	4255	2	972	4	100 20	0	690		17	
##	448	4256	2	951	4	121 26	0	723	925	18	
##	449	4323	1	446	1	-311 381	1	-128	65	0	
##	450	4532	2	832	2	111 64	0	384	768	5	
##	451	5770	1	268	0	-102 113	0	-120	155	0	
##	452	5778	1	817	1	445 817	3	-1	0	0	
##	453	5877	1	578	1	-364 405	1	-238	173	1	
##	454	5984	2	434	0	107 204	0	-114	230	0	
##	455	6016	1	319	1	199 303	0	-46	16	0	
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	457	6023	1	637	1	-238 411	1	-176		1	
	458	6024	1	673	1	-269 435	1	-199		1	
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	460	6524	1	555	1	273 543	1	-40	12	0	
	461	6865	1	905	1	-538 761	2	-234	144	1	
##	462	7103	2	956	2	33 3	0		953	11	
	463	7217	1	604	1	-348 504	1		100	0	
	464	7512	1	400	1	-290 289	1	-180	111	1	
	465	7513	1	451	1	-275 325	1		126	1	
	466	7539	1	294	0	-104 126	0	-120	168	0	
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	468	8031	1	750	1	-320 620	1		130	0	
	469			787	2		2				
	470		1	714	2		3	-288			
	471	9298		546	1		1	-8	0		
	472		1	345	1		1	-116	38		
	473		1	670	0		1	-44	25		
	474 475	1021	1	634	1		1	<b>-</b> 39	11		 
	475 476		1	616	1		1 3	<b>-</b> 56	31		 
	476 477		1	819 760	2   2						 
		10502	2		:				1		:
	478 470		1	679 844	1   0		2	181   -63	110		 
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	480 481	1122     1148	2	355		-134 152	0	<del>-</del> 81   <del>-</del> 155			l l
			1 1	638		-134 152 -368 517	1	-155   -178			
	482 483		1 1	965		-308 517 -670 486	4	665			l I
	484			485	1		1	-18	2		l I
	485			524	1		1	-16   -27	5		l I
##	400	1 1241	1	524	Τ	210 519	1	-21	5	U	1

```
## 486 |
           1247 |
                      1
                          609
                                 1 | -369 466
                                                 1 | -204 143
                                                                  1 |
## 487 l
           1262 |
                          879
                                 4 | -538 296
                                                 3 | 755 583
                      1
                                                                 11 I
## 488 l
           1263
                          805
                                 1 | 117 57
                                                 0 | 423 748
                                                                  5 I
                                 1 | -401 531
                                                 1 | -215 153
## 489 | 132032 |
                      1
                          684
                                                                  1 I
## 490 |
         13333
                      1
                          352
                                 1 | -301 294
                                                 1 | -134
                                                            58
                                                                  0 1
## 491 |
                                 1 | -302 295
                                                 1 | -137
          13334
                          355
                                                            61
                                                                  0 1
                      1
## 492 |
                                 1 | -157 202
                                                 0 | -132 141
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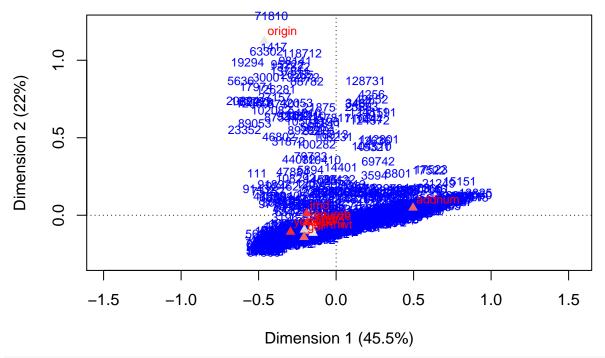
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## 583 |
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                                                                  1 l
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## 593 |
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                                                                 20 I
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## 636 l
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## 637 |
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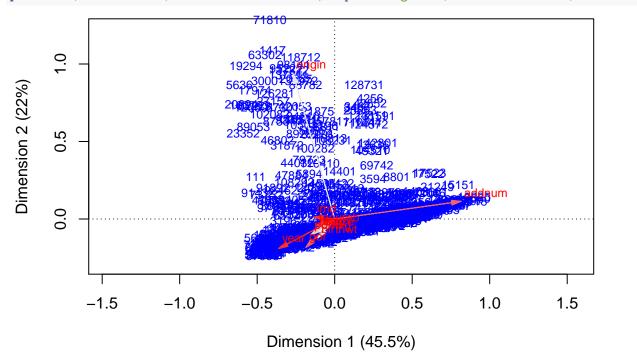
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## 650 l
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## 651 |
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                                                  0 | -131 133
## 655 |
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                                                  1 | -146 126
                      1
                          462
                                                                  0 |
## 660 l
           1016
                          543
                                 1 | -258 373
                                                  1 | -175 171
                      1
                                                                  1 l
            1025
                                 1 | -187 199
                                                  0 | 165 156
## 661 |
                      1
                          355
                                                                  1 l
## 662 |
            1037 |
                          932
                                 5 | -702 482
                                                  6 | 678 449
                      1
                                                                 11 l
## 663 | 107492 |
                      1
                          148
                                 1 | -156
                                           93
                                                  0 | -120
                                                            55
                                                                  0 |
                          865
                                 2 | -473 682
                                                  2 | -244 182
## 664 |
            1091 |
                      1
                                                                  1 l
## 665 |
            1255
                          163
                                 1 |
                                       41
                                            15
                                                  0 | -130 148
                      1
                                                                  0 1
## 666 | 108513 |
                                     -19
                                                  0 | -133 276
                          281
                                 0 |
                                             6
                      1
                                                                  0 1
## 667 l
           1142
                      2
                          119
                                 0 |
                                      -48
                                           71
                                                  0 |
                                                      -40
                                                            48
                                                                  0 1
## 668 I
            1283 |
                      1
                          646
                                 1 | -383 489
                                                  1 | -217 157
                                                                  1 I
## 669 |
                                 1 | -275 406
                                                        87
            1338 |
                      1
                          447
                                                  1 |
                                                                  0 1
## 670 |
                                 1 | -90 69
                                                  0 | -155 202
            1689 |
                          271
                      1
                                                                  1 l
                                 2 | -510 642
                                                  2 |
## 671 |
           1793 l
                      1
                          648
                                                        50
                                                             6
                                                                  0 1
                                 1 | -315 444
## 672 l
           1853 |
                      1
                          446
                                                  1 |
                                                        18
                                                              1
                                                                  0 1
## 673 l
           2073 I
                      1
                          146
                                 1 |
                                       32
                                             9
                                                  0 | -122 136
                                                                  0 |
## 674 |
           2219 |
                          387
                                 1 | -238 374
                                                  1 |
                                                      -44
                      1
                                                            13
                                                                  0 1
                                 2 | -370 322
## 675 |
           2320 |
                      1
                          374
                                                  1 | -148
                                                            52
                                                                  0 |
                                 1 | -254 328
## 676 |
                                                  1 | -193 188
           2552 |
                      1
                          516
                                                                  1 |
## 677 |
           3057 I
                          495
                                 1 | -240 277
                                                  1 | -213 218
                      1
                                                                  1 l
## 678 |
          30913
                      2
                          154
                                 0 | -17 13
                                                  0 |
                                                      -56 141
                                                                  0 |
## 679 |
           3503 |
                      1
                          663
                                 1 | -282 659
                                                  1 |
                                                      -21
                                                             4
                                                                  0 1
## 680 |
           3552 |
                          418
                                 0 | -127 179
                                                  0 | -148 239
                      1
                                                                  1 l
## 681 |
                                 1 | -424 652
                                                  2 |
                                                        -4
           3734 |
                          652
                                                             0
                                                                  0 |
                      1
## 682 |
           3940 l
                          856
                                 1 | -427 834
                                                  2 |
                                                        69
                                                            22
                                                                  0 |
                      1
## 683 l
           4134 I
                                       40
                                                        90
                      1
                          107
                                 1 I
                                           18
                                                  0 |
                                                            90
                                                                  0 1
## 684 l
          42054 I
                      1
                          120
                                       77
                                           58
                                                  0 | -79
                                                            62
                                                                  0 1
## 685 |
           4214
                          781
                                 2 | -514 649
                                                  2 | -232 132
                      1
                                                                  1 I
## 686 |
           4231
                          455
                                 2 | -510 403
                                                  2 | -184
                      1
                                                            52
                                                                  1 |
## 687 |
                          280
                                 1 | -180 279
                                                  0 |
                                                         9
           4288
                                                             1
                                                                  0 1
                      1
                                 1 | -206 230
                                                  0 | -161 140
## 688 |
           4407
                      1
                          370
                                                                  1 |
## 689 |
           4524
                          499
                                 2 | -389 418
                                                  1 | -171
                                                            80
                      1
                                                                  1 I
## 690 l
           5059 I
                      1
                           45
                                 1 |
                                       47
                                           15
                                                  0 |
                                                      -65
                                                            30
                                                                  0 1
                                 2 | -372 347
## 691 |
           5155 |
                          397
                                                  1 | -143
                                                            51
                      1
                                                                  0 1
                                 1 | -107
## 692 |
           5170
                      1
                          127
                                           65
                                                  0 | -105
                                                            62
                                                                  0 |
                                 1 | -217 329
                                                  1 | -178 221
## 693 |
                          550
           5415
                      1
                                                                  1 |
## 694 |
           5416 |
                      1
                          536
                                 1 | -222 321
                                                  1 | -181 215
                                                                  1 l
## 695 |
                                 1 | -98 35
                                                  0 | -85 26
           5675 I
                      1
                           61
                                                                  0 |
## 696 |
           5731
                          476
                                 1 | -290 358
                                                  1 | -167 118
                                                                  1 |
                      1
## 697 |
           5816 |
                      1
                          382
                                 1 | -201 382
                                                  0 |
                                                        2
                                                             0
                                                                  0 |
                                                  1 | -197 187
## 698 |
                          620
                                 1 | -299 433
           5824 |
                      1
                                                                  1 l
## 699 |
           5891 |
                      1
                          300
                                 1 | 180 263
                                                  0 | -67
                                                           36
                                                                  0 |
## 700 l
           5943 |
                          153
                                 0 | -24
                                             7
                                                  0 | -110 146
                                                                  0 |
                      1
                                 1 | -372 565
## 701 |
           6563
                      1
                         743
                                                  1 | -208 177
```

```
## 702 |
            7023 |
                       1
                         135
                                  1 | 104 76
                                                  0 | -91 59
                                                                   0 |
## 703 |
                          786
                                  2 | -568 648
                                                  3 | -262 138
            7081 l
                       1
                                                                   1 I
## 704 l
            7164
                       1
                          243
                                  1 |
                                       -62
                                             38
                                                  0 | -146 206
                                                                   1 I
                                                  0 | -158 285
## 705 |
            7165 |
                          373
                                  0 |
                                       -88
                                             88
                       1
                                                                   1 I
## 706 |
           72954 |
                       1
                          154
                                  0 |
                                        48
                                             28
                                                  0 | -101 125
                                                                   0 1
## 707 |
                                                          3
            7347
                       1
                          763
                                  1 | -435 763
                                                  2 |
                                                              0
                                                                   0 1
## 708 I
                                                         92
            8241 l
                       2
                          133
                                  1 l
                                        95
                                            68
                                                  0 |
                                                             65
                                                                   0 1
                                  0 |
                                       -93 106
## 709 |
            8552 |
                       1
                          399
                                                  0 | -155 293
                                                                   1 |
## 710 |
            8553 I
                       1
                          456
                                  0 |
                                       -79 101
                                                  0 | -148 355
                                                                   1 I
                                       -53
                                            65
                                                  0 | -139 445
## 711 |
            8762 |
                       2
                          510
                                  0 |
                                                                   1 l
## 712 |
            8843 |
                       2
                          203
                                  0 |
                                       -93 154
                                                  0 |
                                                         52
                                                             48
                                                                   0 |
                                  1 | -205 438
## 713 |
            8978 |
                          442
                                                         20
                       1
                                                  0 |
                                                              4
                                                                   0 |
## 714 |
            9143 |
                          720
                                  2 | -624 697
                                                  3 I
                                                        113
                                                             23
                                                                   0 1
                       1
                                  2 | -528 697
## 715 |
            9189 |
                       1
                          749
                                                  2 |
                                                        145
                                                             52
                                                                   0 |
## 716 |
            9324 |
                          280
                                       -31
                                                  0 | -140 267
                       1
                                  0 |
                                             13
                                                                   1 l
## 717 |
          93253 |
                       1
                          145
                                  1 |
                                        -6
                                              0
                                                  0 | -126 145
                                                                   0 |
          93504 |
                       2
                          178
                                        29
                                             14
                                                  0 | 101 164
## 718 |
                                  0 |
                                                                   0 1
## 719 |
            9428 |
                       2
                           26
                                         3
                                              0
                                                  0 | -38
                                                             26
                                  0 1
                                                                   0 1
## 720 l
                          533
                                  0 | -145 234
                                                  0 | -164 299
            9437
                       1
                                                                   1 l
## 721 |
            9632 I
                       1
                          188
                                  1 |
                                       -92
                                            62
                                                  0 | -131 126
                                                                   0
## 722 |
            9635
                       1
                          277
                                  0 1
                                       -81
                                            86
                                                  0 | -121 192
                                                                   0 |
## 723 |
            9831 |
                                  1 | -381 540
                                                  2 | -239 213
                       1
                          753
                                                                   1 |
## 724 |
                                  1 | -261 522
                                                  1 |
                                                         21
            9880
                          525
                                                              3
                                                                   0 |
                       1
## 725 l
                                  1 | -270 646
                                                  1 |
            9881 l
                       1
                          647
                                                         11
                                                              1
                                                                   0 1
                                  2 | -568 636
## 726 |
            9890 |
                       1
                          777
                                                  3 | -267 141
                                                                   1 I
## 727 |
            1001 I
                       1
                          394
                                  1 | -306 323
                                                  1 | -143
                                                             70
                                                                   0 |
## 728 |
            9266 |
                          780
                                  1 | -452 647
                                                  2 | -205 133
                       1
                                                                   1 |
                       2
                                       267 581
## 729
            7810 |
                          603
                                  1 |
                                                  1 |
                                                        -52
                                                             22
                                                                   0 |
## 730 |
            6021 |
                          587
                                  1 | -195 324
                                                  0 | -176 264
                       1
                                                                   1 |
## 731 |
           66015 |
                       2
                          526
                                  1 |
                                       240 470
                                                  1 |
                                                         83
                                                             56
                                                                   0 |
## 732 |
            9931 |
                       1
                          589
                                  2 | -470 586
                                                  2 |
                                                         33
                                                              3
                                                                   0 |
## 733 |
            1117 |
                       1
                          292
                                  1 | -155 173
                                                  0 | -129 119
                                                                   0 1
## 734 |
            1214 |
                       1
                          348
                                  0 | -111 143
                                                  0 | -133 206
                                                                   0 |
## 735 |
          13101 |
                          476
                                  1 | 188 446
                                                         49
                       2
                                                  1 |
                                                             30
                                                                   0 |
## 736 |
            1963
                       2
                          356
                                  1 |
                                       233 311
                                                  1 |
                                                        -88
                                                                   0 |
                                                             44
## 737 I
            2425 I
                       2
                                      318 568
                                                        -38
                          577
                                  1 |
                                                  2 |
                                                              8
                                                                   0 1
## 738 l
            2428
                       1
                          766
                                  1 | -447 637
                                                  2 | -201 129
                                                                   1 I
## 739 |
          30002 |
                       2
                          686
                                  0 | -156 331
                                                  0 | -162 355
                                                                   1 I
## 740 |
            3035 |
                          862
                                  2 | -502 859
                                                  3 |
                                                         28
                                                              3
                                                                   0 |
                       1
## 741 |
                                  2 | -538 527
                                                  3 | -268 131
            3040
                          658
                                                                   1 I
                       1
## 742 |
                                  0 | -118 175
                                                  0 | -161 323
            3195 |
                       1
                          498
                                                                   1 |
## 743 |
            3232
                       2
                                  1 |
                                       294 562
                                                  1 |
                                                         55
                                                             20
                          582
                                                                   0 1
## 744 |
            3271 I
                       2
                          406
                                  1 |
                                      187 363
                                                  1 |
                                                       -64
                                                             43
                                                                   0 1
                                                  1 | -166 123
## 745 |
            3728 |
                          607
                                  1 | -329 484
                       1
                                                                   1 l
## 746 |
                                  1 | -190 336
                                                  0 | -180 299
            4308
                       1
                          636
                                                                   1 |
                                  1 | -126
                                                  0 | -145 122
## 747 |
            4411 |
                       1
                          216
                                           93
                                                                   0 |
## 748 |
            4521
                       2
                          679
                                  1 |
                                       293 636
                                                  1 |
                                                       -76
                                                             43
                                                                   0 |
## 749 |
                                  2 | -569 733
                                                  3 | -246 137
            5111
                       1
                          870
                                                                   1 |
## 750 |
            5875 |
                       2
                          656
                                  1 |
                                       315 646
                                                  2 |
                                                        -39
                                                             10
                                                                   0 1
## 751 |
            5974 |
                       2
                          452
                                  1 |
                                       287 444
                                                  1 |
                                                        -39
                                                              8
                                                                   0 |
                                                  3 | -221 106
## 752 |
                          717
                                  2 | -531 611
            6446 |
                       1
                                                                   1 l
                                       222 321
## 753 |
            6586
                       2
                          363
                                  1 |
                                                  1 |
                                                       -80
                                                            41
                                                                   0 |
            6724 I
                                                  0 | -152 219
## 754 l
                          502
                                  1 | -173 284
                       1
                                                                   1 l
## 755 |
            7066 I
                       1
                          606
                                  2 | -518 531
                                                  2 | -196 76
```

```
## 756 | 72955 |
                     1
                         87
                                1 |
                                     -4 0
                                               0 | -93 86
## 757 l
           7317
                        224
                                               0 | -113 100
                                                               0 1
                     2
                                1 |
                                     126 124
## 758 I
           7329
                     1
                         56
                                1 |
                                     -67
                                          22
                                               0 |
                                                    -84
                                                          34
                                                               0 |
## 759 |
                                0 | -239 697
                                                    -15
           7399 |
                        700
                                               1 |
                                                           3
                                                               0 |
                     1
## 760 |
           7414 |
                     2
                        141
                                0 |
                                      63 130
                                               0 |
                                                      18
                                                          11
                                                               0 1
## 761 |
           7535 |
                        363
                                1 | -281 289
                                               1 | -143
                     1
                                                          74
                                                               0 |
## 762 l
           7559 I
                     2
                        284
                                1 | 149 212
                                               0 | -87
                                                          73
## 763 |
                                1 | -180 309
                                               0 | 104 102
           7684 |
                     1
                        411
                                                               0 |
## 764 l
           7844 |
                     1
                        544
                                1 | -322 368
                                               1 | -222 176
                                                               1 |
## 765 |
                                1 | -329 436
           8518 |
                     1
                        444
                                               1 |
                                                      43
                                                           8
                                                               0 |
## 766 |
           8614 |
                     1
                        729
                                2 | -571 608
                                               3 | -255 121
                                                               1 |
                                               0 | -105 120
## 767 |
           9251 |
                     2
                        399
                                1 |
                                   159 279
                                                               0 |
                     2
                        530
                                     279 503
                                                    -64
## 768 |
           9602 I
                                1 l
                                               1 l
                                                         26
                                                               0 |
## 769 | 10114 |
                        529
                                1 | -300 389
                                               1 | -180 140
                     1
                                                               1 |
                                1 |
## 770 |
           1041 |
                        208
                                     203 201
                                               1 | -39
                     1
                                                               0 |
## 771 | 108883 |
                     2
                        387
                                1 | -182 382
                                               0 |
                                                    -19
                                                           4
                                                               0 |
## 772 |
                        809
                                1 | -320 565
                                               1 | -210 244
           1129 |
                     1
                                                               1 |
## 773 |
         11632 |
                     2
                        361
                                1 | 253 329
                                               1 | -79
                                                         32
## 774 | 11638 |
                        695
                                1 | -357 517
                                               1 | -209 177
                                                               1 |
                     1
## 775 l
           1235 |
                     2
                        486
                                1 |
                                     233 450
                                               1 |
                                                    -66
                                                          36
                                                               0 |
## 776 |
           1300 |
                     2
                        355
                                1 |
                                     176 269
                                               0 | -100
                                                          87
                                                               0 |
## 777 |
           1301 |
                     2
                        262
                                1 |
                                    155 231
                                               0 |
                                                      56
## 778 | 132033 |
                        650
                                1 | -371 647
                                               2 |
                                                    -26
                                                               0 |
                                                           3
                     1
## 779 l
           1322 I
                     2
                        571
                                1 l
                                     281 556
                                               1 |
                                                    -46
                                                               0 |
                                                          15
## 780 |
                                                    -95
           1343 |
                     1
                         84
                                1 |
                                    -10
                                           1
                                               0 |
                                                          83
                                                               0 |
## 781 |
           1359
                     1 156
                                1 | -107 66
                                               0 | -125
                                                          90
                                                               0 |
##
## Columns:
##
                     qlt
                                  k=1 cor ctr
                                                 k=2 cor ctr
        name
               {\tt mass}
                          inr
## 1 | sex |
                 27
                     236
                           18 | -171 172
                                            7 | -104
                                                       64
## 2 | tnrb |
                 50
                     194
                           38 | -188 182
                                           15 l
                                                -47
                                                       11
                                                            2 |
## 3 | orgn |
                 38
                     994
                          226 | -464 144
                                           72 | 1125 850
                                                         873 l
## 4 | hhsz |
                 76
                     249
                           30 | -147 214
                                           14 |
                                                 -60
                                                       35
                                                            5 I
## 5 | addn |
                     998
                          305 | 496 988 664 |
                                                           13 |
                311
                                                  48
                                                       9
                           57 | -190 146
## 6
     | imd |
                 59
                     146
                                           18 l
                                                  12
                                                        1
                                                            0 |
## 7
     | brth |
                     376
                            22 | -148 235
                                           12 | -115 141
                                                           14 I
                 61
## 8 | prft |
                 64
                     185
                            69 | -205 153
                                           23 | -94
## 9 | gor |
                 93
                     219
                          105 | -207 149
                                          35 | -142
                                                       70
                                                           34 |
## 10 | year |
                174
                     606
                           111 | -294 534 130 | -108
                                                      72
                                                           36 |
## 11 | aggr |
                     357
                           17 | -159 270 10 | -90 87
                                                            7 |
                 47
plot(cora, contrib = "absolute")
```



plot(cora, mass = TRUE, contrib = "absolute", map = "rowgreen", arrows = c(FALSE, TRUE))



```
# The first dimension explains 44% of the inertia.
```

<sup>#</sup> The 2nd dimension explains a further 21.4%.

<sup>#</sup> The first two dimensions seem to explain much of the data.

#### Part 4/4: The Effect of Urban Deprivation – Propensity Analysis

```
Propensity Analysis
                                                                       ##############################
# Covert the ordinal scale of treatment variable (imd) to binary scale for computing the propensity sco
hse.mk90 <- hse.mk60
hse.mk90$imd <- ifelse(hse.mk90$imd == 1, 1,
                     ifelse(hse.mk90$imd == 5, 0, NA))
table(hse.mk90$imd)
##
##
     0
## 1830 2097
hse.mk90 <- hse.mk90[complete.cases(hse.mk90), ]
# Compute the Propensity scores
reg <- glm(imd ~ sex + tenureb + origin + hhsize + addnum + birthwt + porftvg + gor + aggr + year + hyp
                                             family=binomial, data=hse.mk90)
hse.mk90\fit.value <- fitted.values(reg)
# Propensity Scores Matching & Average Treatment Effect on Treated
matching.vars <- cbind(hse.mk90\$fit.value)</pre>
psm <- Match(Y=hse.mk90$hyper, Tr=hse.mk90$imd, X=matching.vars, Weight = 2, ties = F)
summary.Match(psm)
##
## Estimate... 0.018598
## SE..... 0.0075139
## T-stat..... 2.4751
## p.val..... 0.013319
## Original number of observations...... 3927
## Original number of treated obs...... 2097
## Matched number of observations..... 2097
## Matched number of observations (unweighted). 2097
# 1 -- Estimate effect of deprivation on hypertention (significant)
# Balance test
MatchBalance(imd ~ sex + tenureb + origin + hhsize + addnum + birthwt + porftvg + gor + aggr + year,
            match.out=psm, data=hse.mk90)
##
## ***** (V1) sex ****
                        Before Matching
                                              After Matching
## mean treatment......
                            1.4831
                                              1.4831
                            1.4956
                                              1.4649
## mean control.....
## std mean diff.....
                          -2.5123
                                              3.6254
## mean raw eQQ diff..... 0.012568
                                            0.018121
## med raw eQQ diff.....
```

```
## max raw eQQ diff.....
##
## mean eCDF diff..... 0.0062787
                                           0.0090606
## med eCDF diff..... 0.0062787
                                           0.0090606
## max eCDF diff.....
                          0.012557
                                            0.018121
##
## var ratio (Tr/Co)....
                           0.99886
                                              1.0038
## T-test p-value.....
                           0.43243
                                                0.24
##
##
## ***** (V2) tenureb ****
##
                        Before Matching
                                              After Matching
## mean treatment......
                            2.1497
                                              2.1497
                                              2.0482
## mean control.....
                            3.1869
## std mean diff.....
                           -128.24
                                              12.559
##
## mean raw eQQ diff.....
                         1.0377
                                             0.14354
## med raw eQQ diff.....
                                                   0
                                1
## max raw eQQ diff.....
                                 2
                                                   2
##
## mean eCDF diff.....
                           0.17286
                                            0.028708
## med eCDF diff.....
                          0.031363
                                           0.0090606
## max eCDF diff.....
                           0.49059
                                             0.11683
## var ratio (Tr/Co).....
                            0.5675
                                               0.816
## T-test p-value..... < 2.22e-16
                                          5.8512e-08
## KS Bootstrap p-value.. < 2.22e-16
                                           < 2.22e-16
## KS Naive p-value..... < 2.22e-16
                                          7.4074e-13
## KS Statistic..... 0.49059
                                             0.11683
##
##
## ***** (V3) origin *****
##
                        Before Matching
                                              After Matching
## mean treatment.....
                            1.5131
                                              1.5131
## mean control.....
                            2.8087
                                              1.7787
## std mean diff.....
                           -67.155
                                             -13.767
##
## mean raw eQQ diff.....
                            1.2984
                                             0.28755
## med raw eQQ diff.....
                                 0
                                                   0
## max raw eQQ diff.....
                                                   2
##
## mean eCDF diff.....
                          0.076049
                                            0.016859
## med eCDF diff.....
                          0.079276
                                            0.003815
## max eCDF diff.....
                           0.21319
                                             0.12732
## var ratio (Tr/Co).....
                         0.28059
                                             0.87491
## T-test p-value..... < 2.22e-16
                                           2.3668e-06
## KS Bootstrap p-value.. < 2.22e-16
                                          < 2.22e-16
## KS Naive p-value..... < 2.22e-16
                                           3.4417e-15
## KS Statistic....
                           0.21319
                                             0.12732
##
##
## ***** (V4) hhsize ****
##
                        Before Matching
                                              After Matching
```

##	mean treatment	4.0877	4.0877
##	mean control	4.1743	4.1149
##	std mean diff	-9.7108	-3.049
##			
##	mean raw eQQ diff	0.40546	0.19504
##	$\  \   \text{med} \  \   \text{raw eQQ diff}$	0	0
##	max raw eQQ diff	2	3
##			
##	mean eCDF diff	0.040475	0.021671
##	$\  \   \text{med} \ \ \text{eCDF diff}$	0.028262	0.015737
##	$ \text{max}  \text{eCDF diff} \dots \dots$	0.10353	0.065808
##			
##	var ratio (Tr/Co)	0.45237	0.55952
##	T-test p-value	0.018052	0.40808
##	KS Bootstrap p-value	< 2.22e-16	< 2.22e-16
##	KS Naive p-value	1.5955e-09	0.00022749
##	KS Statistic	0.10353	0.065808
##			
##			
##	***** (V5) addnum ****	*	
##		Before Matching	After Matching
##	mean treatment	16.147	16.147
##	mean control	16.685	16.417
##	std mean diff	-4.5391	-2.28
##			
	mean raw eQQ diff		0.79542
	med raw eQQ diff		1
	max raw eQQ diff	5	8
##	and it.	0.044470	0.045704
	mean eCDF diff		0.015794
	med eCDF diff		0.015498
	max eCDF diff	0.037979	0.044826
##	Tan matic (Tan/Ca)	0 07447	1 0079
	<pre>var ratio (Tr/Co) T-test p-value</pre>	0.97447	1.0978 0.45047
		0.15000	0.45047
	KS Bootstrap p-value KS Naive p-value	0.11931	0.028
	KS Statistic	0.037979	0.029365
##	ND DUALISCIC	0.037979	0.044020
##			
	**** (V6) birthwt ***	**	
##	(10) 222320	Before Matching	After Matching
	mean treatment	3.4064	3.4064
	mean control		3.3824
	std mean diff		4.0128
##			· · <del></del>
##	mean raw eQQ diff	0.16895	0.076757
	med raw eQQ diff		0.06
##	max raw eQQ diff	0.61	0.7
##			
	${\tt mean \ eCDF \ diff}$		0.022989
##	$\  \   \text{med} \ \ e\text{CDF diff}$	0.051557	0.018121
	$\verb"max" eCDF diff$	0.1313	0.073915
##			

```
## var ratio (Tr/Co)..... 0.92313
                                            0.98438
## T-test p-value..... < 2.22e-16
                                            0.19158
## KS Bootstrap p-value.. < 2.22e-16
                                         < 2.22e-16
## KS Naive p-value..... 4.6629e-15
                                         2.1154e-05
## KS Statistic..... 0.1313
                                           0.073915
##
## ***** (V7) porftvg *****
##
                       Before Matching
                                             After Matching
## mean treatment.....
                           3.7492
                                             3.7492
## mean control.....
                           3.2437
                                             3.6371
## std mean diff.....
                           31.067
                                             6.888
## mean raw eQQ diff....
                          0.50437
                                            0.11874
## med raw eQQ diff.....
                                                 0
                                Ω
## max raw eQQ diff.....
                                2
                                                  1
##
## mean eCDF diff..... 0.072207
                                           0.016963
## med eCDF diff..... 0.064757
                                           0.01526
## max eCDF diff.....
                            0.116
                                           0.047687
##
## var ratio (Tr/Co)..... 0.87716
                                            1.0186
## T-test p-value..... < 2.22e-16
                                           0.020721
## KS Bootstrap p-value.. < 2.22e-16
                                              0.002
## KS Naive p-value..... 7.5787e-12
                                          0.016983
## KS Statistic..... 0.116
                                           0.047687
##
## ***** (V8) gor ****
                       Before Matching
                                             After Matching
## mean treatment.....
                            5.825
                                             5.825
## mean control.....
                           4.0792
                                             5.7129
## std mean diff.....
                           69.839
                                             4.4831
## mean raw eQQ diff.....
                           1.7443
                                            0.23891
## med raw eQQ diff.....
                            2
                                                 0
## max raw eQQ diff.....
                                3
                                                  1
##
## mean eCDF diff..... 0.19397
                                           0.026546
## med eCDF diff..... 0.22449
                                           0.019075
## max eCDF diff.....
                          0.30776
                                            0.07773
## var ratio (Tr/Co)..... 1.0481
                                              1.031
## T-test p-value..... < 2.22e-16
                                           0.057349
## KS Bootstrap p-value.. < 2.22e-16
                                         < 2.22e-16
## KS Naive p-value..... < 2.22e-16
                                         6.2881e-06
## KS Statistic..... 0.30776
                                            0.07773
##
## ***** (V9) aggr *****
##
                       Before Matching
                                             After Matching
## mean treatment.....
                        2.4902
                                             2.4902
## mean control.....
                           2.4672
                                             2.4912
## std mean diff.....
                           4.602
                                           -0.19074
```

```
##
## mean raw eQQ diff.....
                           0.022951
                                           0.00095374
## med raw eQQ diff.....
                                  0
                                                     0
## max raw eQQ diff.....
                                  1
                                                     1
## mean eCDF diff.....
                           0.011506
                                           0.00047687
## med eCDF diff.....
                           0.011506
                                            0.00047687
## max eCDF diff.....
                           0.023011
                                            0.00095374
##
## var ratio (Tr/Co).....
                                              0.99993
                           1.0039
## T-test p-value.....
                            0.14993
                                              0.95084
##
##
## ***** (V10) year *****
                         Before Matching
                                               After Matching
## mean treatment......
                             9.5031
                                               9.5031
                            9.7022
                                                9.609
## mean control.....
## std mean diff.....
                           -6.1378
                                               -3.2638
## mean raw eQQ diff....
                          0.20164
                                              0.38817
## med raw eQQ diff.....
                                  0
                                                    0
## max raw eQQ diff.....
                                  2
                                                     2
##
## mean eCDF diff.....
                           0.018896
                                             0.034812
## med eCDF diff.....
                           0.018954
                                             0.028135
## max eCDF diff.....
                           0.037739
                                             0.086314
##
## var ratio (Tr/Co).....
                           0.95043
                                              0.86366
## T-test p-value.....
                           0.058498
                                              0.31015
## KS Bootstrap p-value..
                              0.038
                                            < 2.22e-16
## KS Naive p-value.....
                             0.1236
                                             3.282e-07
## KS Statistic.....
                           0.037739
                                              0.086314
##
##
## Before Matching Minimum p.value: < 2.22e-16
## Variable Name(s): tenureb origin hhsize birthwt porftvg gor Number(s): 2 3 4 6 7 8
##
## After Matching Minimum p.value: < 2.22e-16
## Variable Name(s): tenureb origin hhsize birthwt gor year Number(s): 2 3 4 6 8 10
# Regression with a matched dataset -- this time using ordinal scale of treatment (imd)
# Create a new dataset after matching
hse.mk.FX <- rbind(hse.mk60[psm$index.control,],hse.mk60[psm$index.treated,])
summary(lm(hyper ~ factor(imd),data=hse.mk.FX))
##
## lm(formula = hyper ~ factor(imd), data = hse.mk.FX)
##
## Residuals:
                    Median
       Min
                 1Q
                                   3Q
                                           Max
## -0.10792 -0.09750 -0.05755 -0.05542 0.94458
##
## Coefficients:
```

```
Estimate Std. Error t value Pr(>|t|)
## (Intercept)
               ## factor(imd)2 -0.002123
                         0.012474 -0.170 0.86489
## factor(imd)3 0.036792 0.012703
                                     2.896 0.00379 **
## factor(imd)4 0.039950
                         0.012874
                                     3.103 0.00193 **
## factor(imd)5 0.050376 0.013011
                                     3.872 0.00011 ***
## Signif. codes: 0 '***' 0.001 '**' 0.05 '.' 0.1 ' ' 1
## Residual standard error: 0.2707 on 4189 degrees of freedom
## Multiple R-squared: 0.006513, Adjusted R-squared: 0.005564
## F-statistic: 6.865 on 4 and 4189 DF, p-value: 1.666e-05
  2 -- Balance our datasets for more accurate measure & conduct factor regression analysis
#
            Estimating deprivation on a ordinal scales (significant)
#
       This shows that regression with a matched dataset is a good alternative to matching
summary(lm(hyper ~ factor(imd) + sex + tenureb + origin + hhsize + addnum + birthwt + porftvg + gor + a
          ,data=hse.mk.FX))
##
## Call:
## lm(formula = hyper ~ factor(imd) + sex + tenureb + origin + hhsize +
      addnum + birthwt + porftvg + gor + aggr + year + sysavg +
##
      diaavg, data = hse.mk.FX)
##
## Residuals:
       Min
                1Q
                    Median
                                  3Q
## -0.41181 -0.13351 -0.03614 0.05144 0.83970
## Coefficients:
                 Estimate Std. Error t value Pr(>|t|)
## (Intercept) -1.432e+00 5.506e-02 -26.010 < 2e-16 ***
## factor(imd)2 -2.460e-02 1.040e-02 -2.365 0.018081 *
## factor(imd)3 1.336e-03 1.074e-02
                                    0.124 0.900989
## factor(imd)4 -6.004e-03 1.119e-02 -0.536 0.591788
## factor(imd)5 8.137e-03 1.239e-02 0.657 0.511508
              1.750e-04 7.143e-03 0.025 0.980450
## sex
## tenureb
               1.720e-03 3.806e-03 0.452 0.651372
## origin
             -7.315e-03 2.168e-03 -3.374 0.000747 ***
## hhsize
              8.516e-03 3.218e-03
                                    2.646 0.008172 **
## addnum
              -1.688e-04 2.538e-04 -0.665 0.506088
## birthwt
              -3.886e-03 6.123e-03 -0.635 0.525656
## porftvg
              -1.573e-05 2.054e-03 -0.008 0.993892
## gor
              -2.821e-03 1.400e-03 -2.015 0.043981 *
               -4.012e-02 7.773e-03 -5.162 2.55e-07 ***
## aggr
## year
               -2.003e-03 3.448e-03 -0.581 0.561307
## sysavg
              8.847e-03 4.251e-04 20.812 < 2e-16 ***
               1.081e-02 5.097e-04 21.204 < 2e-16 ***
## diaavg
## Signif. codes: 0 '***' 0.001 '**' 0.05 '.' 0.1 ' ' 1
## Residual standard error: 0.223 on 4177 degrees of freedom
## Multiple R-squared: 0.3278, Adjusted R-squared: 0.3252
## F-statistic: 127.3 on 16 and 4177 DF, p-value: < 2.2e-16
```

# 3 -- However, if we control other variables, deprivation is not significant predictors