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##### INSTALLING PACKAGES #####
install.packages("readxl")
library(readxl)
install.packages("fastDummies")
library("fastDummies")
install.packages("tidyverse")
library(tidyverse)
install.packages("skedastic")
library("skedastic")
install.packages("whitestrapp")
library("whitestrapp")
install.packages("dplyr")
install.packages("ggpubr")
install.packages("tseries")
library("dplyr")
library("ggpubr")
library("tseries")
##### MANAGING DATA AND CREATING VARIABLES #####

ipodata_all <- read_excel("C:/Users/Adrian Wara Betsi/Desktop/MASTER/
data_modify_all.xlsx") #Windows
ipodata_npe <- read_excel("C:/Users/Adrian Wara Betsi/Desktop/MASTER/
data_modify_NPE.xlsx") #Windows
ipodata_pe <- read_excel("C:/Users/Adrian Wara Betsi/Desktop/MASTER/
data_modify_PE.xlsx") #Windows
ipodata_vc <- read_excel("C:/Users/Adrian Wara Betsi/Desktop/MASTER/
data_modify_VC.xlsx") #Windows
returndata12mts <- read_excel("C:/Users/Adrian Wara Betsi/Desktop/MASTER/
bhar_car.xlsx", sheet = "12mts") #Windows
returndata24mts <- read_excel("C:/Users/Adrian Wara Betsi/Desktop/MASTER/
bhar_car.xlsx", sheet = "24mts") #Windows
returndata36mts <- read_excel("C:/Users/Adrian Wara Betsi/Desktop/MASTER/
bhar_car.xlsx", sheet = "36mts") #Windows

#ipodata_all <- read_excel("~/Desktop/master/data_modify.
27.05_UnderwriterScore.xlsx") #Mac
#ipodata_npe <- read_excel("~/Desktop/master/data_modify_NPE.
27.05_UnderwriterScore.xlsx") #Mac
#ipodata_pe <- read_excel("~/Desktop/master/data_modify_PE.
27.05_UnderwriterScore.xlsx") #Mac
#ipodata_vc <- read_excel("~/Desktop/master/data_modify_VC.
27.05_UnderwriterScore.xlsx") #Mac
#returndata12mts <- read_excel("~/Desktop/master/bhar_car.xlsx", sheet =
"12mts") #Mac
#returndata24mts <- read_excel("~/Desktop/master/bhar_car.xlsx", sheet =
"24mts") #Mac
#returndata36mts <- read_excel("~/Desktop/master/bhar_car.xlsx", sheet =
"36mts") #Mac

ipodata_all <- dummy_cols(ipodata_all, select_columns =
c("Definition", "Country", "MarketActivity", "Ranking", "IndustrySector"))

##### MAKING MORE DATASETS IPO UNDERPRICING #####

##### CREATING DATASET ACCORDING TO MARKET ACTIVITY

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# Creating data set with only Cold/HOT issues across ALL
all_ipo_cold <- subset(ipodata_all, MarketActivity == "Cold",
                      select=c(Ticker, Country, Definition,
IndustrySector, Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySol
all_ipo_hot <- subset(ipodata_all, MarketActivity == "Hot",
                      select=c(Ticker, Country, Definition,
IndustrySector, Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySol

# Creating data set with only Cold/Hot issues across NPE
npe_ipo_cold <- subset(ipodata_npe, MarketActivity == "Cold",
                      select=c(Ticker, Country, Definition,
IndustrySector, Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySol
npe_ipo_hot <- subset(ipodata_npe, MarketActivity == "Hot",
                      select=c(Ticker, Country, Definition,
IndustrySector, Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySol

# Creating data set with only Cold/Hot issues across PE
pe_ipo_cold <- subset(ipodata_pe, MarketActivity == "Cold",
                      select=c(Ticker, Country, Definition,
IndustrySector, Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySol
pe_ipo_hot <- subset(ipodata_pe, MarketActivity == "Hot",
                      select=c(Ticker, Country, Definition,
IndustrySector, Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySol

# Creating data set with only Cold/Hot issues across VC
vc_ipo_cold <- subset(ipodata_vc, MarketActivity == "Cold",
                      select=c(Ticker, Country, Definition,
IndustrySector, Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySol
vc_ipo_hot <- subset(ipodata_vc, MarketActivity == "Hot",
                      select=c(Ticker, Country, Definition,
IndustrySector, Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySol

##### CREATING DATASET ACCORDING TO COUNTRY

# Creating data set with only US/UK across ALL
all_ipo_us <- subset(ipodata_all, Country == "US",
                      select=c(Ticker, Definition, MarketActivity,
IndustrySector, Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySol
all_ipo_ln <- subset(ipodata_all, Country == "LN",
                      select=c(Ticker, Definition, MarketActivity,
IndustrySector, Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySol

# Creating data set with only US/UK across NPE
npe_ipo_us <- subset(ipodata_npe, Country == "US",
                      select=c(Ticker, Definition, MarketActivity,
IndustrySector, Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySol
npe_ipo_ln <- subset(ipodata_npe, Country == "LN",
                      select=c(Ticker, Definition, MarketActivity,
IndustrySector, Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySol

# Creating data set with only US/UK across PE
pe_ipo_us <- subset(ipodata_pe, Country == "US",
                      select=c(Ticker, Definition, MarketActivity,
IndustrySector, Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySol
pe_ipo_ln <- subset(ipodata_pe, Country == "LN",
                      select=c(Ticker, Definition, MarketActivity,
IndustrySector, Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySol

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# Creating data set with only US/UK across VC
vc_ipo_us <- subset(ipodata_vc, Country == "US",
                    select=c(Ticker, Definition, MarketActivity,
IndustrySector, Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold)
vc_ipo_ln <- subset(ipodata_vc, Country == "LN",
                    select=c(Ticker, Definition, MarketActivity,
IndustrySector, Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold)

##### CREATING DATA SET DEPENDENT ON BOOKRUNNER RANKING

# Creating data set with only GOOD/BAD ranking across ALL
all_ipo_good <- subset(ipodata_all, Ranking == "Good",
                       select=c(Ticker, Country, Definition, MarketActivity,
IndustrySector, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day)

all_ipo_bad <- subset(ipodata_all, Ranking == "Bad",
                      select=c(Ticker, Country, Definition, MarketActivity,
IndustrySector, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day)

# Creating data set with only GOOD/BAD ranking across NPE
npe_ipo_good <- subset(ipodata_npe, Ranking == "Good",
                       select=c(Ticker, Country, Definition, MarketActivity,
IndustrySector, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day)

npe_ipo_bad <- subset(ipodata_npe, Ranking == "Bad",
                      select=c(Ticker, Country, Definition, MarketActivity,
IndustrySector, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day)

# Creating data set with only GOOD/BAD ranking across PE
pe_ipo_good <- subset(ipodata_pe, Ranking == "Good",
                      select=c(Ticker, Country, Definition, MarketActivity,
IndustrySector, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day)
pe_ipo_bad <- subset(ipodata_pe, Ranking == "Bad",
                      select=c(Ticker, Country, Definition, MarketActivity,
IndustrySector, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day)

# Creating data set with only GOOD/BAD ranking across VC
vc_ipo_good <- subset(ipodata_vc, Ranking == "Good",
                      select=c(Ticker, Country, Definition, MarketActivity,
IndustrySector, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day)
vc_ipo_bad <- subset(ipodata_vc, Ranking == "Bad",
                      select=c(Ticker, Country, Definition, MarketActivity,
IndustrySector, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day)

##### CREATING DATA SET ISOLATING INDUSTRY

# Creating data set with only ONE INDUSTRY across ALL

#Basic Materials
all_ipo_basicmaterials <- subset(ipodata_all, IndustrySector ==
"BasicMaterials",
                                select=c(Ticker, Country, Definition, MarketActivity,
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

#Communications

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all_ipo_communications <- subset(ipodata_all, IndustrySector ==
"Communications",
                                select=c(Ticker, Country, Definition, MarketActivity,
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

#Consumer, Cyclical
all_ipo_consumercyclical <- subset(ipodata_all, IndustrySector ==
"ConsumerCyclical",
                                select=c(Ticker, Country, Definition, MarketActivity
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

#Consumer, Non-Cyclical
all_ipo_consumernoncyclical <- subset(ipodata_all, IndustrySector ==
"ConsumerNonCyclical",
                                select=c(Ticker, Country, Definition, MarketActiv
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

#Energy
all_ipo_energy <- subset(ipodata_all, IndustrySector == "Energy",
                                select=c(Ticker, Country, Definition, MarketActivity,
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

#Financial
all_ipo_financial <- subset(ipodata_all, IndustrySector == "Financial",
                                select=c(Ticker, Country, Definition, MarketActivity,
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

#Government
all_ipo_government <- subset(ipodata_all, IndustrySector == "Government",
                                select=c(Ticker, Country, Definition, MarketActivity,
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

#Industrial
all_ipo_industrial <- subset(ipodata_all, IndustrySector == "Industrial",
                                select=c(Ticker, Country, Definition, MarketActivity,
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

#Technology
all_ipo_technology <- subset(ipodata_all, IndustrySector == "Technology",
                                select=c(Ticker, Country, Definition, MarketActivity,
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

#Utilities
all_ipo_utilities <- subset(ipodata_all, IndustrySector == "Utilities",
                                select=c(Ticker, Country, Definition, MarketActivity,
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

# Creating data set with only ONE INDUSTRY across NPE

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#Basic Materials
npe_ipo_basicmaterials <- subset(ipodata_npe, IndustrySector ==
"BasicMaterials",
                                select=c(Ticker, Country, Definition, MarketActivity,
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

#Communications
npe_ipo_communications <- subset(ipodata_npe, IndustrySector ==
"Communications",
                                select=c(Ticker, Country, Definition, MarketActivity,
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

#Consumer, Cyclical
npe_ipo_consumercyclical <- subset(ipodata_npe, IndustrySector ==
"ConsumerCyclical",
                                select=c(Ticker, Country, Definition, MarketActivity
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

#Consumer, Non-Cyclical
npe_ipo_consumernoncyclical <- subset(ipodata_npe, IndustrySector ==
"ConsumerNonCyclical",
                                select=c(Ticker, Country, Definition, MarketActiv
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

#Energy
npe_ipo_energy <- subset(ipodata_npe, IndustrySector == "Energy",
                                select=c(Ticker, Country, Definition, MarketActivity,
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

#Financial
npe_ipo_financial <- subset(ipodata_npe, IndustrySector == "Financial",
                                select=c(Ticker, Country, Definition, MarketActivity,
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

#Government
npe_ipo_government <- subset(ipodata_npe, IndustrySector == "Government",
                                select=c(Ticker, Country, Definition, MarketActivity,
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

#Industrial
npe_ipo_industrial <- subset(ipodata_npe, IndustrySector == "Industrial",
                                select=c(Ticker, Country, Definition, MarketActivity,
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

#Technology
npe_ipo_technology <- subset(ipodata_npe, IndustrySector == "Technology",
                                select=c(Ticker, Country, Definition, MarketActivity,
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

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#Utilities
npe_ipo_utilities <- subset(ipodata_npe, IndustrySector == "Utilities",
                           select=c(Ticker, Country, Definition, MarketActivity,
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

# Creating data set with only ONE INDUSTRY across PE

#Basic Materials
pe_ipo_basicmaterials <- subset(ipodata_pe, IndustrySector ==
"BasicMaterials",
                               select=c(Ticker, Country, Definition, MarketActivity,
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

#Communications
pe_ipo_communications <- subset(ipodata_pe, IndustrySector ==
"Communications",
                                select=c(Ticker, Country, Definition, MarketActivity,
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

#Consumer, Cyclical
pe_ipo_consumercyclical <- subset(ipodata_pe, IndustrySector ==
"ConsumerCyclical",
                                  select=c(Ticker, Country, Definition, MarketActivity,
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

#Consumer, Non-Cyclical
pe_ipo_consumernoncyclical <- subset(ipodata_pe, IndustrySector ==
"ConsumerNonCyclical",
                                      select=c(Ticker, Country, Definition, MarketActivi
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

#Energy
pe_ipo_energy <- subset(ipodata_pe, IndustrySector == "Energy",
                        select=c(Ticker, Country, Definition, MarketActivity,
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

#Financial
pe_ipo_financial <- subset(ipodata_pe, IndustrySector == "Financial",
                           select=c(Ticker, Country, Definition, MarketActivity,
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

#Government
pe_ipo_government <- subset(ipodata_pe, IndustrySector == "Government",
                             select=c(Ticker, Country, Definition, MarketActivity,
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

#Industrial
pe_ipo_industrial <- subset(ipodata_pe, IndustrySector == "Industrial",

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                                select=c(Ticker, Country, Definition, MarketActivity,
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

#Technology
pe_ipo_technology <- subset(ipodata_pe, IndustrySector == "Technology",
                                select=c(Ticker, Country, Definition, MarketActivity,
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

#Utilities
pe_ipo_utilities <- subset(ipodata_pe, IndustrySector == "Utilities",
                                select=c(Ticker, Country, Definition, MarketActivity,
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

# Creating data set with only ONE INDUSTRY across VC

#Basic Materials
vc_ipo_basicmaterials <- subset(ipodata_vc, IndustrySector ==
"BasicMaterials",
                                select=c(Ticker, Country, Definition, MarketActivity,
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

#Communications
vc_ipo_communications <- subset(ipodata_vc, IndustrySector ==
"Communications",
                                select=c(Ticker, Country, Definition, MarketActivity,
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

#Consumer, Cyclical
vc_ipo_consumercyclical <- subset(ipodata_vc, IndustrySector ==
"ConsumerCyclical",
                                select=c(Ticker, Country, Definition, MarketActivity,
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

#Consumer, Non-Cyclical
vc_ipo_consumernoncyclical <- subset(ipodata_vc, IndustrySector ==
"ConsumerNonCyclical",
                                select=c(Ticker, Country, Definition, MarketActivi
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

#Energy
vc_ipo_energy <- subset(ipodata_vc, IndustrySector == "Energy",
                                select=c(Ticker, Country, Definition, MarketActivity,
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

#Financial
vc_ipo_financial <- subset(ipodata_vc, IndustrySector == "Financial",
                                select=c(Ticker, Country, Definition, MarketActivity,
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

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#Government
vc_ipo_government <- subset(ipodata_vc, IndustrySector == "Government",
                             select=c(Ticker, Country, Definition, MarketActivity,
                                       Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

#Industrial
vc_ipo_industrial <- subset(ipodata_vc, IndustrySector == "Industrial",
                             select=c(Ticker, Country, Definition, MarketActivity,
                                       Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

#Technology
vc_ipo_technology <- subset(ipodata_vc, IndustrySector == "Technology",
                             select=c(Ticker, Country, Definition, MarketActivity,
                                       Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

#Utilities
vc_ipo_utilities <- subset(ipodata_vc, IndustrySector == "Utilities",
                             select=c(Ticker, Country, Definition, MarketActivity,
                                       Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

##### CREATING DATASET ACCORDING TO MARKET CAP RATING

# Creating data set with only High/Med/Low Market Cap ranking across ALL
all_ipo_mcap_high <- subset(ipodata_all, McapRanking == "High",
                             select=c(Ticker, Country, Definition, IndustrySector, Marke
                                       Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

all_ipo_mcap_med <- subset(ipodata_all, McapRanking == "Medium",
                             select=c(Ticker, Country, Definition, IndustrySector, Marke
                                       Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

all_ipo_mcap_low <- subset(ipodata_all, McapRanking == "Low",
                             select=c(Ticker, Country, Definition, IndustrySector, Marke
                                       Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

# Creating data set with only High/Med/Low Market Cap ranking across NPE
npe_ipo_mcap_high <- subset(ipodata_npe, McapRanking == "High",
                             select=c(Ticker, Country, Definition, IndustrySector, Marke
                                       Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

npe_ipo_mcap_med <- subset(ipodata_npe, McapRanking == "Medium",
                             select=c(Ticker, Country, Definition, IndustrySector, Marke
                                       Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

npe_ipo_mcap_low <- subset(ipodata_npe, McapRanking == "Low",
                             select=c(Ticker, Country, Definition, IndustrySector, Marke
                                       Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

# Creating data set with only High/Med/Low Market Cap ranking across PE
pe_ipo_mcap_high <- subset(ipodata_pe, McapRanking == "High",

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        select=c(Ticker, Country, Definition, IndustrySector, MarketA
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

pe_ipo_mcap_med <- subset(ipodata_pe, McapRanking == "Medium",
        select=c(Ticker, Country, Definition, IndustrySector, MarketA
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

pe_ipo_mcap_low <- subset(ipodata_pe, McapRanking == "Low",
        select=c(Ticker, Country, Definition, IndustrySector, MarketA
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

# Creating data set with only High/Med/Low Market Cap ranking across VC
vc_ipo_mcap_high <- subset(ipodata_vc, McapRanking == "High",
        select=c(Ticker, Country, Definition, IndustrySector, MarketA
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

vc_ipo_mcap_med <- subset(ipodata_vc, McapRanking == "Medium",
        select=c(Ticker, Country, Definition, IndustrySector, MarketA
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

vc_ipo_mcap_low <- subset(ipodata_vc, McapRanking == "Low",
        select=c(Ticker, Country, Definition, IndustrySector, MarketA
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

##### CREATING DATASET ACCORDING TO EQUITY RANKING

# Creating data set with only High/Med/Low Equity ranking across ALL
all_ipo_eq_high <- subset(ipodata_all, EquityRanking == "High",
        select=c(Ticker, Country, Definition, IndustrySector, MarketA
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

all_ipo_eq_med <- subset(ipodata_all, EquityRanking == "Medium",
        select=c(Ticker, Country, Definition, IndustrySector, MarketA
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

all_ipo_eq_low <- subset(ipodata_all, EquityRanking == "Low",
        select=c(Ticker, Country, Definition, IndustrySector, MarketA
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

# Creating data set with only High/Med/Low Equity ranking across NPE
npe_ipo_eq_high <- subset(ipodata_npe, EquityRanking == "High",
        select=c(Ticker, Country, Definition, IndustrySector, MarketA
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

npe_ipo_eq_med <- subset(ipodata_npe, EquityRanking == "Medium",
        select=c(Ticker, Country, Definition, IndustrySector, MarketA
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

npe_ipo_eq_low <- subset(ipodata_npe, EquityRanking == "Low",
        select=c(Ticker, Country, Definition, IndustrySector, MarketA
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

# Creating data set with only High/Med/Low Equity ranking across PE
pe_ipo_eq_high <- subset(ipodata_pe, EquityRanking == "High",

```

```

        select=c(Ticker, Country, Definition, IndustrySector, MarketAc
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

pe_ipo_eq_med <- subset(ipodata_pe, EquityRanking == "Medium",
        select=c(Ticker, Country, Definition, IndustrySector, MarketAc
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

pe_ipo_eq_low <- subset(ipodata_pe, EquityRanking == "Low",
        select=c(Ticker, Country, Definition, IndustrySector, MarketAc
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

# Creating data set with only High/Med/Low Equity ranking across PE
vc_ipo_eq_high <- subset(ipodata_vc, EquityRanking == "High",
        select=c(Ticker, Country, Definition, IndustrySector, MarketAc
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

vc_ipo_eq_med <- subset(ipodata_vc, EquityRanking == "Medium",
        select=c(Ticker, Country, Definition, IndustrySector, MarketAc
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

vc_ipo_eq_low <- subset(ipodata_vc, EquityRanking == "Low",
        select=c(Ticker, Country, Definition, IndustrySector, MarketAc
Ranking, OfferTo1stClose, OfferToWeek1, OfferToMonth1, McapAtOffer, EquitySold, VW1day, VW1wee

##### STATISTICS AND TESTING IPO UNDERPRICING #####

# TESTING WHETHER THE DATA IS NORMALLY DISTRIBUTED + PLOT

norm_test_ipo <- shapiro.test(ipodata_all$OfferTo1stClose) #Shapiro Wilk
head(norm_test_ipo)
norm_test_ipo2 <- jarque.bera.test(ipodata_all$OfferTo1stClose) # Jarque
Bera
head(norm_test_ipo2)
norm_test_ret <- shapiro.test(returndata12mts$BHAR12mnd) #Shapiro Wilk
head(norm_test_ret)
norm_test_ret2 <- jarque.bera.test(returndata12mts$BHAR12mnd) # Jarque Bera
head(norm_test_ret2)

# Testing whether First day, week and month of whole sample is statistically
signdiff. from zero (EW = EqualWeight VW = ValueWeight)
tttest_all_1day <- t.test(ipodata_all$OfferTo1stClose, mu=0, alternative =
"two.sided", var.equal = FALSE)
tttest_all_1week <- t.test(ipodata_all$OfferToWeek1, mu=0, alternative =
"two.sided", var.equal = FALSE)
tttest_all_1month <- t.test(ipodata_all$OfferToMonth1, mu=0, alternative =
"two.sided", var.equal = FALSE)

# Testing whether First day, week and month of NPE sample is statistically
signdiff. from zero (EW = EqualWeight VW = ValueWeight)
tttest_npe_1day <- t.test(ipodata_npe$OfferTo1stClose, mu=0, alternative =
"two.sided", var.equal = FALSE)

```

```

ttest_npe_1week <- t.test(ipodata_npe$OfferToWeek1,mu=0, alternative =
"two.sided",var.equal = FALSE)
ttest_npe_1month <- t.test(ipodata_npe$OfferToMonth1,mu=0, alternative =
"two.sided",var.equal = FALSE)

# Testing whether First day,week and month of PE sample is statistically
signdiff. from zero (EW = EqualWeight VW = ValueWeight)
ttest_pe_1day <- t.test(ipodata_pe$OfferTo1stClose,mu=0, alternative =
"two.sided",var.equal = FALSE)
ttest_pe_1week <- t.test(ipodata_pe$OfferToWeek1,mu=0, alternative =
"two.sided",var.equal = FALSE)
ttest_pe_1month <- t.test(ipodata_pe$OfferToMonth1,mu=0, alternative =
"two.sided",var.equal = FALSE)

# Testing whether First day,week and month of VC sample is statistically
signdiff. from zero (EW = EqualWeight VW = ValueWeight)
ttest_vc_1day <- t.test(ipodata_vc$OfferTo1stClose,mu=0, alternative =
"two.sided",var.equal = FALSE)
ttest_vc_1week <- t.test(ipodata_vc$OfferToWeek1,mu=0, alternative =
"two.sided",var.equal = FALSE)
ttest_vc_1month <- t.test(ipodata_vc$OfferToMonth1,mu=0, alternative =
"two.sided",var.equal = FALSE)

#Testing whether means is statistically different from eachother

#Comparing NPE & PE
mean_diff_day_npe_pe <-
t.test(ipodata_npe$OfferTo1stClose,ipodata_pe$OfferTo1stClose, alternative
= "two.sided", var.equal = TRUE)
mean_diff_week_npe_pe <-
t.test(ipodata_npe$OfferToWeek1,ipodata_pe$OfferToWeek1, alternative =
"two.sided", var.equal = TRUE)
mean_diff_month_npe_pe <-
t.test(ipodata_npe$OfferToMonth1,ipodata_pe$OfferToMonth1, alternative =
"two.sided", var.equal = TRUE)

#Comparing NPE % VC
mean_diff_day_npe_vc <-
t.test(ipodata_npe$OfferTo1stClose,ipodata_vc$OfferTo1stClose, alternative
= "two.sided", var.equal = TRUE)
mean_diff_week_npe_vc <-
t.test(ipodata_npe$OfferToWeek1,ipodata_vc$OfferToWeek1, alternative =
"two.sided", var.equal = TRUE)
mean_diff_month_npe_vc <-
t.test(ipodata_npe$OfferToMonth1,ipodata_vc$OfferToMonth1, alternative =
"two.sided", var.equal = TRUE)

#Comparing PE % VC
mean_diff_day_pe_vc <-
t.test(ipodata_pe$OfferTo1stClose,ipodata_vc$OfferTo1stClose, alternative =
"two.sided", var.equal = TRUE)
mean_diff_week_pe_vc <-
t.test(ipodata_pe$OfferToWeek1,ipodata_vc$OfferToWeek1, alternative =
"two.sided", var.equal = TRUE)
mean_diff_month_pe_vc <-
t.test(ipodata_pe$OfferToMonth1,ipodata_vc$OfferToMonth1, alternative =
"two.sided", var.equal = TRUE)

```

```

##### Testing whether First day, week and month of HOT/COLD MARKETS is
statistically signdiff from zero.
# OFFER TO FIRST DAY CLOSE
ttest_cold_all_1day <- t.test(all_ipo_cold$OfferTo1stClose,mu=0,alternative
= "two.sided",var.equal = FALSE)
ttest_cold_npe_1day <- t.test(npe_ipo_cold$OfferTo1stClose,mu=0,alternative
= "two.sided",var.equal = FALSE)
ttest_cold_pe_1day <- t.test(pe_ipo_cold$OfferTo1stClose,mu=0,alternative
= "two.sided",var.equal = FALSE)
ttest_cold_vc_1day <- t.test(vc_ipo_cold$OfferTo1stClose,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_hot_all_1day <- t.test(all_ipo_hot$OfferTo1stClose,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_hot_npe_1day <- t.test(npe_ipo_hot$OfferTo1stClose,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_hot_pe_1day <- t.test(pe_ipo_hot$OfferTo1stClose,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_hot_vc_1day <- t.test(vc_ipo_hot$OfferTo1stClose,mu=0,alternative =
"two.sided",var.equal = FALSE)

#OFFER TO FIRST WEEK CLOSE
ttest_cold_all_1week <- t.test(all_ipo_cold$OfferToWeek1,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_cold_npe_1week <- t.test(npe_ipo_cold$OfferToWeek1,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_cold_pe_1week <- t.test(pe_ipo_cold$OfferToWeek1,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_cold_vc_1week <- t.test(vc_ipo_cold$OfferToWeek1,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_hot_all_1week <- t.test(all_ipo_hot$OfferToWeek1,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_hot_npe_1week <- t.test(npe_ipo_hot$OfferToWeek1,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_hot_pe_1week <- t.test(pe_ipo_hot$OfferToWeek1,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_hot_vc_1week <- t.test(vc_ipo_hot$OfferToWeek1,mu=0,alternative =
"two.sided",var.equal = FALSE)

#OFFER TO FIRST MONTH CLOSE
ttest_cold_all_1month <- t.test(all_ipo_cold$OfferToMonth1,mu=0,alternative
= "two.sided",var.equal = FALSE)
ttest_cold_npe_1month <- t.test(npe_ipo_cold$OfferToMonth1,mu=0,alternative
= "two.sided",var.equal = FALSE)
ttest_cold_pe_1month <- t.test(pe_ipo_cold$OfferToMonth1,mu=0,alternative
= "two.sided",var.equal = FALSE)
ttest_cold_vc_1month <- t.test(vc_ipo_cold$OfferToMonth1,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_hot_all_1month <- t.test(all_ipo_hot$OfferToMonth1,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_hot_npe_1month <- t.test(npe_ipo_hot$OfferToMonth1,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_hot_pe_1month <- t.test(pe_ipo_hot$OfferToMonth1,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_hot_vc_1month <- t.test(vc_ipo_hot$OfferToMonth1,mu=0,alternative =
"two.sided",var.equal = FALSE)

#Testing whether means is statistically different from each other

```

```

#Hot market VS Cold market for all subgroups - DAY
mean_diff_ma_day_all <-
t.test(all_ipo_cold$OfferTo1stClose,all_ipo_hot$OfferTo1stClose,
alternative = "two.sided", var.equal = TRUE)
mean_diff_ma_day_npe <-
t.test(npe_ipo_cold$OfferTo1stClose,npe_ipo_hot$OfferTo1stClose,
alternative = "two.sided", var.equal = TRUE)
mean_diff_ma_day_pe <-
t.test(pe_ipo_cold$OfferTo1stClose,pe_ipo_hot$OfferTo1stClose, alternative
= "two.sided", var.equal = TRUE)
mean_diff_ma_day_vc <-
t.test(vc_ipo_cold$OfferTo1stClose,vc_ipo_hot$OfferTo1stClose, alternative
= "two.sided", var.equal = TRUE)
#HOT VS HOT PE VS NPE
mean_diff_ma_day_pe_npe <-
t.test(npe_ipo_hot$OfferTo1stClose,pe_ipo_hot$OfferTo1stClose, alternative
= "two.sided", var.equal = TRUE)

#Hot market VS Cold market for all subgroups - WEEK
mean_diff_ma_week_all <-
t.test(all_ipo_cold$OfferToWeek1,all_ipo_hot$OfferToWeek1, alternative =
"two.sided", var.equal = TRUE)
mean_diff_ma_week_npe <-
t.test(npe_ipo_cold$OfferToWeek1,npe_ipo_hot$OfferToWeek1, alternative =
"two.sided", var.equal = TRUE)
mean_diff_ma_week_pe <-
t.test(pe_ipo_cold$OfferToWeek1,pe_ipo_hot$OfferToWeek1, alternative =
"two.sided", var.equal = TRUE)
mean_diff_ma_week_vc <-
t.test(vc_ipo_cold$OfferToWeek1,vc_ipo_hot$OfferToWeek1, alternative =
"two.sided", var.equal = TRUE)
#HOT VS HOT PE VS NPE
mean_diff_ma_week_pe_npe <-
t.test(npe_ipo_hot$OfferToWeek1,pe_ipo_hot$OfferToWeek1, alternative =
"two.sided", var.equal = TRUE)

#Hot market VS Cold market for all subgroups - MONTH
mean_diff_ma_month_all <-
t.test(all_ipo_cold$OfferToMonth1,all_ipo_hot$OfferToMonth1, alternative =
"two.sided", var.equal = TRUE)
mean_diff_ma_month_npe <-
t.test(npe_ipo_cold$OfferToMonth1,npe_ipo_hot$OfferToMonth1, alternative =
"two.sided", var.equal = TRUE)
mean_diff_ma_month_pe <-
t.test(pe_ipo_cold$OfferToMonth1,pe_ipo_hot$OfferToMonth1, alternative =
"two.sided", var.equal = TRUE)
mean_diff_ma_month_vc <-
t.test(vc_ipo_cold$OfferToMonth1,vc_ipo_hot$OfferToMonth1, alternative =
"two.sided", var.equal = TRUE)
#HOT VS HOT NPE VS PE
mean_diff_ma_month_pe_npe <-
t.test(npe_ipo_hot$OfferToMonth1,pe_ipo_hot$OfferToMonth1, alternative =
"two.sided", var.equal = TRUE)

##### Testing whether First day, week and month of US/LN (Whole sample
/ALL) is statistically sign.diff from zero.

```

```

#US
ttest_all_1day_us <- t.test(all_ipo_us$OfferTo1stClose,mu=0, alternative =
"two.sided",var.equal = FALSE)
ttest_all_1week_us <- t.test(all_ipo_us$OfferToWeek1,mu=0, alternative =
"two.sided",var.equal = FALSE)
ttest_all_1month_us <- t.test(all_ipo_us$OfferToMonth1,mu=0, alternative =
"two.sided",var.equal = FALSE)

#LN
ttest_all_1day_ln <- t.test(all_ipo_ln$OfferTo1stClose,mu=0, alternative =
"two.sided",var.equal = FALSE)
ttest_all_1week_ln <- t.test(all_ipo_ln$OfferToWeek1,mu=0, alternative =
"two.sided",var.equal = FALSE)
ttest_all_1month_ln <- t.test(all_ipo_ln$OfferToMonth1,mu=0, alternative =
"two.sided",var.equal = FALSE)

#Mean differences US VS LN
mean_diff_country_day <-
t.test(all_ipo_us$OfferTo1stClose,all_ipo_ln$OfferTo1stClose, alternative =
"two.sided", var.equal = TRUE)
mean_diff_country_week <-
t.test(all_ipo_us$OfferToWeek1,all_ipo_ln$OfferToWeek1, alternative =
"two.sided", var.equal = TRUE)
mean_diff_country_month <-
t.test(all_ipo_us$OfferToMonth1,all_ipo_ln$OfferToMonth1, alternative =
"two.sided", var.equal = TRUE)

##### Testing whether First day, week and month of Bookrunners (Whole
sample /ALL) is statistically sign.diff from zero.

#ALL
ttest_all_1day_bookrunner_good <- t.test(all_ipo_good$OfferTo1stClose,mu=0,
alternative = "two.sided", var.equal = FALSE)
ttest_all_1week_bookrunner_good <- t.test(all_ipo_good$OfferToWeek1,mu=0,
alternative = "two.sided", var.equal = FALSE)
ttest_all_1month_bookrunner_good <- t.test(all_ipo_good$OfferToMonth1,mu=0,
alternative = "two.sided", var.equal = FALSE)

ttest_all_1day_bookrunner_bad <- t.test(all_ipo_bad$OfferTo1stClose,mu=0,
alternative = "two.sided", var.equal = FALSE)
ttest_all_1week_bookrunner_bad <- t.test(all_ipo_bad$OfferToWeek1,mu=0,
alternative = "two.sided", var.equal = FALSE)
ttest_all_1month_bookrunner_bad <- t.test(all_ipo_bad$OfferToMonth1,mu=0,
alternative = "two.sided", var.equal = FALSE)

#NPE
ttest_npe_1day_bookrunner_good <- t.test(npe_ipo_good$OfferTo1stClose,mu=0,
alternative = "two.sided", var.equal = FALSE)
ttest_npe_1week_bookrunner_good <- t.test(npe_ipo_good$OfferToWeek1,mu=0,
alternative = "two.sided", var.equal = FALSE)
ttest_npe_1month_bookrunner_good <- t.test(npe_ipo_good$OfferToMonth1,mu=0,
alternative = "two.sided", var.equal = FALSE)

ttest_npe_1day_bookrunner_bad <- t.test(npe_ipo_bad$OfferTo1stClose,mu=0,
alternative = "two.sided", var.equal = FALSE)
ttest_npe_1week_bookrunner_bad <- t.test(npe_ipo_bad$OfferToWeek1,mu=0,
alternative = "two.sided", var.equal = FALSE)

```

```

ttest_npe_1month_bookrunner_bad <- t.test(npe_ipo_bad$OfferToMonth1,mu=0,
alternative = "two.sided", var.equal = FALSE)

#PE
ttest_pe_1day_bookrunner_good <- t.test(pe_ipo_good$OfferTo1stClose,mu=0,
alternative = "two.sided", var.equal = FALSE)
ttest_pe_1week_bookrunner_good <- t.test(pe_ipo_good$OfferToWeek1,mu=0,
alternative = "two.sided", var.equal = FALSE)
ttest_pe_1month_bookrunner_good <- t.test(pe_ipo_good$OfferToMonth1,mu=0,
alternative = "two.sided", var.equal = FALSE)

ttest_pe_1day_bookrunner_bad <- t.test(pe_ipo_bad$OfferTo1stClose,mu=0,
alternative = "two.sided", var.equal = FALSE)
ttest_pe_1week_bookrunner_bad <- t.test(pe_ipo_bad$OfferToWeek1,mu=0,
alternative = "two.sided", var.equal = FALSE)
ttest_pe_1month_bookrunner_bad <- t.test(pe_ipo_bad$OfferToMonth1,mu=0,
alternative = "two.sided", var.equal = FALSE)

#VC
ttest_vc_1day_bookrunner_good <- t.test(vc_ipo_good$OfferTo1stClose,mu=0,
alternative = "two.sided", var.equal = FALSE)
ttest_vc_1week_bookrunner_good <- t.test(vc_ipo_good$OfferToWeek1,mu=0,
alternative = "two.sided", var.equal = FALSE)
ttest_vc_1month_bookrunner_good <- t.test(vc_ipo_good$OfferToMonth1,mu=0,
alternative = "two.sided", var.equal = FALSE)

ttest_vc_1day_bookrunner_bad <- t.test(vc_ipo_bad$OfferTo1stClose,mu=0,
alternative = "two.sided", var.equal = FALSE)
ttest_vc_1week_bookrunner_bad <- t.test(vc_ipo_bad$OfferToWeek1,mu=0,
alternative = "two.sided", var.equal = FALSE)
ttest_vc_1month_bookrunner_bad <- t.test(vc_ipo_bad$OfferToMonth1,mu=0,
alternative = "two.sided", var.equal = FALSE)

#Mean differences GOOD VS BAD
mean_diff_bookrunner_day <-
t.test(all_ipo_good$OfferTo1stClose,all_ipo_bad$OfferTo1stClose,
alternative = "two.sided", var.equal = TRUE)
mean_diff_bookrunner_week <-
t.test(all_ipo_good$OfferToWeek1,all_ipo_bad$OfferToWeek1, alternative =
"two.sided", var.equal = TRUE)
mean_diff_bookrunner_month <-
t.test(all_ipo_good$OfferToMonth1,all_ipo_bad$OfferToMonth1, alternative =
"two.sided", var.equal = TRUE)
#PE VS PE GOOD VS BAD
mean_diff_bookrunner_day_pe_pe <-
t.test(pe_ipo_good$OfferTo1stClose,pe_ipo_bad$OfferTo1stClose, alternative
= "two.sided",var.equal = TRUE)
mean_diff_bookrunner_week_pe_pe <-
t.test(pe_ipo_good$OfferToWeek1,pe_ipo_bad$OfferToWeek1, alternative =
"two.sided",var.equal = TRUE)
mean_diff_bookrunner_month_pe_pe <-
t.test(pe_ipo_good$OfferToMonth1,pe_ipo_bad$OfferToMonth1, alternative =
"two.sided",var.equal = TRUE)

##### Testing whether First day, week and month of Industry (Whole
sample /ALL) is statistically sign.diff from zero.

```

```

#FIRST DAY, EXCLUDING GOVERNMENT DUE TO FEW OBSERVATIONS
ttest_all_1day_basicmaterials <-
t.test(all_ipo_basicmaterials$OfferTo1stClose,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_all_1day_communications <-
t.test(all_ipo_communications$OfferTo1stClose,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_all_1day_consumercyclical <-
t.test(all_ipo_consumercyclical$OfferTo1stClose,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_all_1day_consumernoncyclical <-
t.test(all_ipo_consumernoncyclical$OfferTo1stClose,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_all_1day_energy <-
t.test(all_ipo_energy$OfferTo1stClose,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_all_1day_financial <-
t.test(all_ipo_financial$OfferTo1stClose,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_all_1day_technology <-
t.test(all_ipo_technology$OfferTo1stClose,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_all_1day_industrial <-
t.test(all_ipo_industrial$OfferTo1stClose,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_all_1day_utilities <-
t.test(all_ipo_utilities$OfferTo1stClose,mu=0,alternative =
"two.sided",var.equal = FALSE)

#FIRST WEEK, EXCLUDING GOVERNMENT DEU TO FEW OBSERVATIONS
ttest_all_1week_basicmaterials <-
t.test(all_ipo_basicmaterials$OfferToWeek1,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_all_1week_communications <-
t.test(all_ipo_communications$OfferToWeek1,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_all_1week_consumercyclical <-
t.test(all_ipo_consumercyclical$OfferToWeek1,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_all_1week_consumernoncyclical <-
t.test(all_ipo_consumernoncyclical$OfferToWeek1,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_all_1week_energy <-
t.test(all_ipo_energy$OfferToWeek1,mu=0,alternative = "two.sided",var.equal
= FALSE)
ttest_all_1week_financial <-
t.test(all_ipo_financial$OfferToWeek1,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_all_1week_technology <-
t.test(all_ipo_technology$OfferToWeek1,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_all_1week_industrial <-
t.test(all_ipo_industrial$OfferToWeek1,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_all_1week_utilities <-
t.test(all_ipo_utilities$OfferToWeek1,mu=0,alternative =
"two.sided",var.equal = FALSE)

```



```

#FIRST MONTH, EXCLUDING GOVERNMENT DUE TO FEW OBSERVATIONS
ttest_all_1month_basicmaterials <-
t.test(all_ipo_basicmaterials$OfferToMonth1,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_all_1month_communications <-
t.test(all_ipo_communications$OfferToMonth1,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_all_1month_consumercyclical <-
t.test(all_ipo_consumercyclical$OfferToMonth1,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_all_1month_consumernoncyclical <-
t.test(all_ipo_consumernoncyclical$OfferToMonth1,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_all_1month_energy <-
t.test(all_ipo_energy$OfferToMonth1,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_all_1month_financial <-
t.test(all_ipo_financial$OfferToMonth1,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_all_1month_technology <-
t.test(all_ipo_technology$OfferToMonth1,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_all_1month_industrial <-
t.test(all_ipo_industrial$OfferToMonth1,mu=0,alternative =
"two.sided",var.equal = FALSE)
ttest_all_1month_utilities <-
t.test(all_ipo_utilities$OfferToMonth1,mu=0,alternative =
"two.sided",var.equal = FALSE)

##### Testing whether First day, week and month of MarketCap at offer
ranking (Whole sample /ALL) is statistically sign.diff from zero.

#FIRST DAY
ttest_all_1day_mcap_high <- t.test(all_ipo_mcap_high$OfferTo1stClose,mu=0,
alternative = "two.sided",var.equal = FALSE)
ttest_all_1day_mcap_med <- t.test(all_ipo_mcap_med$OfferTo1stClose,mu=0,
alternative = "two.sided",var.equal = FALSE)
ttest_all_1day_mcap_low <- t.test(all_ipo_mcap_low$OfferTo1stClose,mu=0,
alternative = "two.sided",var.equal = FALSE)

#FIRST WEEK
ttest_all_1week_mcap_high <- t.test(all_ipo_mcap_high$OfferToWeek1,mu=0,
alternative = "two.sided",var.equal = FALSE)
ttest_all_1week_mcap_med <- t.test(all_ipo_mcap_med$OfferToWeek1,mu=0,
alternative = "two.sided",var.equal = FALSE)
ttest_all_1week_mcap_low <- t.test(all_ipo_mcap_low$OfferToWeek1,mu=0,
alternative = "two.sided",var.equal = FALSE)

#FIRST MONTH
ttest_all_1month_mcap_high <- t.test(all_ipo_mcap_high$OfferToMonth1,mu=0,
alternative = "two.sided",var.equal = FALSE)
ttest_all_1month_mcap_med <- t.test(all_ipo_mcap_med$OfferToMonth1,mu=0,
alternative = "two.sided",var.equal = FALSE)
ttest_all_1month_mcap_low <- t.test(all_ipo_mcap_low$OfferToMonth1,mu=0,
alternative = "two.sided",var.equal = FALSE)

# Mean differences - DAY

```

```

mean_diff_1day_mcap_high_med <- t.test(all_ipo_mcap_high$OfferTo1stClose,
all_ipo_mcap_med$OfferTo1stClose, alternative = "two.sided",var.equal =
TRUE)
mean_diff_1day_mcap_high_low <- t.test(all_ipo_mcap_high$OfferTo1stClose,
all_ipo_mcap_low$OfferTo1stClose, alternative = "two.sided",var.equal =
TRUE)
mean_diff_1day_mcap_med_low <- t.test(all_ipo_mcap_med$OfferTo1stClose,
all_ipo_mcap_low$OfferTo1stClose, alternative = "two.sided",var.equal =
TRUE)

# Mean differences - WEEK
mean_diff_1week_mcap_high_med <- t.test(all_ipo_mcap_high$OfferToWeek1,
all_ipo_mcap_med$OfferToWeek1, alternative = "two.sided",var.equal = TRUE)
mean_diff_1week_mcap_high_low <- t.test(all_ipo_mcap_high$OfferToWeek1,
all_ipo_mcap_low$OfferToWeek1, alternative = "two.sided",var.equal = TRUE)
mean_diff_1week_mcap_med_low <- t.test(all_ipo_mcap_med$OfferToWeek1,
all_ipo_mcap_low$OfferToWeek1, alternative = "two.sided",var.equal = TRUE)

# Mean differences - MONTH
mean_diff_1month_mcap_high_med <- t.test(all_ipo_mcap_high$OfferToMonth1,
all_ipo_mcap_med$OfferToMonth1, alternative = "two.sided",var.equal = TRUE)
mean_diff_1month_mcap_high_low <- t.test(all_ipo_mcap_high$OfferToMonth1,
all_ipo_mcap_low$OfferToMonth1, alternative = "two.sided",var.equal = TRUE)
mean_diff_1month_mcap_med_low <- t.test(all_ipo_mcap_med$OfferToMonth1,
all_ipo_mcap_low$OfferToMonth1, alternative = "two.sided",var.equal = TRUE)

##### Testing whether First day, week and month of MarketCap at offer
ranking (Whole sample /ALL) is statistically sign.diff from zero.

#FIRST DAY
tttest_all_1day_eq_high <- t.test(all_ipo_eq_high$OfferTo1stClose,mu=0,
alternative = "two.sided",var.equal = FALSE)
tttest_all_1day_eq_med <- t.test(all_ipo_eq_med$OfferTo1stClose,mu=0,
alternative = "two.sided",var.equal = FALSE)
tttest_all_1day_eq_low <- t.test(all_ipo_eq_low$OfferTo1stClose,mu=0,
alternative = "two.sided",var.equal = FALSE)

#FIRST WEEK
tttest_all_1week_eq_high <- t.test(all_ipo_eq_high$OfferToWeek1,mu=0,
alternative = "two.sided",var.equal = FALSE)
tttest_all_1week_eq_med <- t.test(all_ipo_eq_med$OfferToWeek1,mu=0,
alternative = "two.sided",var.equal = FALSE)
tttest_all_1week_eq_low <- t.test(all_ipo_eq_low$OfferToWeek1,mu=0,
alternative = "two.sided",var.equal = FALSE)

#FIRST MONTH
tttest_all_1month_eq_high <- t.test(all_ipo_eq_high$OfferToMonth1,mu=0,
alternative = "two.sided",var.equal = FALSE)
tttest_all_1month_eq_med <- t.test(all_ipo_eq_med$OfferToMonth1,mu=0,
alternative = "two.sided",var.equal = FALSE)
tttest_all_1month_eq_low <- t.test(all_ipo_eq_low$OfferToMonth1,mu=0,
alternative = "two.sided",var.equal = FALSE)

#MEAN DIFFERENCES - DAY
mean_diff_1day_eq_high_med <- t.test(all_ipo_eq_high$OfferTo1stClose,
all_ipo_eq_med$OfferTo1stClose, alternative = "two.sided",var.equal = TRUE)

```

```
mean_diff_1day_eq_high_low <- t.test(all_ipo_eq_high$OfferTo1stClose,
all_ipo_eq_low$OfferTo1stClose, alternative = "two.sided",var.equal = TRUE)
mean_diff_1day_eq_med_low <- t.test(all_ipo_eq_med$OfferTo1stClose,
all_ipo_eq_low$OfferTo1stClose, alternative = "two.sided",var.equal = TRUE)
```

```
#MEAN DIFFERENCES - WEEK
```

```
mean_diff_1week_eq_high_med <- t.test(all_ipo_eq_high$OfferToWeek1,
all_ipo_eq_med$OfferToWeek1, alternative = "two.sided",var.equal = TRUE)
mean_diff_1week_eq_high_low <- t.test(all_ipo_eq_high$OfferToWeek1,
all_ipo_eq_low$OfferToWeek1, alternative = "two.sided",var.equal = TRUE)
mean_diff_1week_eq_med_low <- t.test(all_ipo_eq_med$OfferToWeek1,
all_ipo_eq_low$OfferToWeek1, alternative = "two.sided",var.equal = TRUE)
```

```
#MEAN DIFFERENCES - MONTH
```

```
mean_diff_1month_eq_high_med <- t.test(all_ipo_eq_high$OfferToMonth1,
all_ipo_eq_med$OfferToMonth1, alternative = "two.sided",var.equal = TRUE)
mean_diff_1month_eq_high_low <- t.test(all_ipo_eq_high$OfferToMonth1,
all_ipo_eq_low$OfferToMonth1, alternative = "two.sided",var.equal = TRUE)
mean_diff_1month_eq_med_low <- t.test(all_ipo_eq_med$OfferToMonth1,
all_ipo_eq_low$OfferToMonth1, alternative = "two.sided",var.equal = TRUE)
```

```
##### RUNNING A REGRESSION ON IPO UNDERPRICING #####
```

```
##### Regression on 1day-Close excluding industries
```

```
ipol_day <- lm(ipodata_all$OfferTo1stClose ~
  ipodata_all$Definition_PE +
  ipodata_all$Definition_VC +
  ipodata_all$MarketActivity_Hot +
  ipodata_all$Ranking_Good +
  ipodata_all$McapAtOffer +
  ipodata_all$EquitySold)
```

```
summary(ipol_day)
```

```
white_ipol_day <- white_test(ipol_day)
```

```
head(white_ipol_day)
```

```
##### Regression on 1day-Close including industries
```

```
ipo2_day <- lm(ipodata_all$OfferTo1stClose ~
  ipodata_all$Definition_PE +
  ipodata_all$Definition_VC +
  ipodata_all$MarketActivity_Hot +
  ipodata_all$Ranking_Good +
  ipodata_all$McapAtOffer +
  ipodata_all$EquitySold +
  ipodata_all$IndustrySector_ConsumerCyclical +
  ipodata_all$IndustrySector_Financial
)
```

```
summary(ipo2_day)
```

```
white_ipo2_day <- white_test(ipo2_day)
```

```
##### Regression on 1week-Close excluding industries
```

```
ipol_week <- lm(ipodata_all$OfferToWeek1 ~
  ipodata_all$Definition_PE +
  ipodata_all$Definition_VC +
  ipodata_all$MarketActivity_Hot +
  ipodata_all$Ranking_Good +
```

```

        ipodata_all$McapAtOffer +
        ipodata_all$EquitySold)
summary(ipol_week)
white_ipol_week <- white_test(ipol_week)

##### Regression on 1week-Close including industries
ipo2_week <- lm(ipodata_all$OfferToWeek1 ~
        ipodata_all$Definition_PE +
        ipodata_all$Definition_VC +
        ipodata_all$MarketActivity_Hot +
        ipodata_all$Ranking_Good +
        ipodata_all$McapAtOffer +
        ipodata_all$EquitySold +
        ipodata_all$IndustrySector_ConsumerCyclical +
        ipodata_all$IndustrySector_Financial)
summary(ipo2_week)
white_ipo2_week <- white_test(ipo2_week)

##### Regression on 1month-Close excluding industries
ipol_month <- lm(ipodata_all$OfferToMonth1 ~
        ipodata_all$Definition_PE +
        ipodata_all$Definition_VC +
        ipodata_all$MarketActivity_Hot +
        ipodata_all$Ranking_Good +
        ipodata_all$McapAtOffer +
        ipodata_all$EquitySold)
summary(ipol_month)
white_ipol_month <- white_test(ipol_month)

##### Regression on 1Month-Close including industries
ipo2_month <- lm(ipodata_all$OfferToMonth1 ~
        ipodata_all$Definition_PE +
        ipodata_all$Definition_VC +
        ipodata_all$MarketActivity_Hot +
        ipodata_all$Ranking_Good +
        ipodata_all$McapAtOffer +
        ipodata_all$EquitySold +
        ipodata_all$IndustrySector_ConsumerCyclical +
        ipodata_all$IndustrySector_Financial)
summary(ipo2_month)
white_ipo2_month <- white_test(ipo2_month)

##### SECTION DIVIDER #####

##### MAKING MORE DATASETS PERFORMANCE #####

#COLD AND HOT MARKETS ALL 12 mts
perf_all_12mts_hot <- subset(returndata12mts, MarketActivity == "Hot",
        select=c(Country, Definition,
Industry, Ranking, McapAtOffer, McapRanking, EquitySold,
EquityRanking,
OfferTo1stClose, BHAR12mnd, CAR12mnd))

perf_all_12mts_cold <- subset(returndata12mts, MarketActivity == "Cold",

```

```

        select=c(Country, Definition, Industry, Ranking,
McapAtOffer, McapRanking, EquitySold,
                EquityRanking, OfferTolstClose,
BHAR12mnd, CAR12mnd))

#COLD AND HOT MARKETS ALL 24 mts
perf_all_24mts_hot <- subset(returndata24mts, MarketActivity == "Hot",
        select=c(Country, Definition, Industry, Ranking,
McapAtOffer, McapRanking, EquitySold,
                EquityRanking, OfferTolstClose,
BHAR24mnd, CAR24mnd))

perf_all_24mts_cold <- subset(returndata24mts, MarketActivity == "Cold",
        select=c(Country, Definition, Industry, Ranking,
McapAtOffer, McapRanking, EquitySold,
                EquityRanking, OfferTolstClose,
BHAR24mnd, CAR24mnd))

#COLD AND HOT MARKETS ALL 36 mts
perf_all_36mts_hot <- subset(returndata36mts, MarketActivity == "Hot",
        select=c(Country, Definition, Industry,
Ranking, McapAtOffer, McapRanking, EquitySold,
                EquityRanking, OfferTolstClose,
BHAR36mnd, CAR36mnd))

perf_all_36mts_cold <- subset(returndata36mts, MarketActivity == "Cold",
        select=c(Country, Definition, Industry,
Ranking, McapAtOffer, McapRanking, EquitySold,
                EquityRanking, OfferTolstClose,
BHAR36mnd, CAR36mnd))

# DIFFERENTIATIN BY SPONSOR TYPE
#NPE
perf_npe_12mts <- subset(returndata12mts, Definition == "NPE",
        select=c(Country, Industry, MarketActivity, Ranking, McapAtOffer, M
                EquityRanking, OfferTolstClose,
BHAR12mnd, CAR12mnd))
perf_npe_24mts <- subset(returndata24mts, Definition == "NPE",
        select=c(Country, Industry, MarketActivity, Ranking, McapAtOffer, M
                EquityRanking, OfferTolstClose,
BHAR24mnd, CAR24mnd))
perf_npe_36mts <- subset(returndata36mts, Definition == "NPE",
        select=c(Country, Industry, MarketActivity, Ranking, McapAtOffer, M
                EquityRanking, OfferTolstClose,
BHAR36mnd, CAR36mnd))

perf_npe_12mts_hot <- subset(perf_npe_12mts, MarketActivity == "Hot",
        select=c(BHAR12mnd, CAR12mnd))
perf_npe_12mts_cold <- subset(perf_npe_12mts, MarketActivity == "Cold",
        select=c(BHAR12mnd, CAR12mnd))
perf_npe_24mts_hot <- subset(perf_npe_24mts, MarketActivity == "Hot",
        select=c(BHAR24mnd, CAR24mnd))
perf_npe_24mts_cold <- subset(perf_npe_24mts, MarketActivity == "Cold",
        select=c(BHAR24mnd, CAR24mnd))
perf_npe_36mts_hot <- subset(perf_npe_36mts, MarketActivity == "Hot",
        select=c(BHAR36mnd, CAR36mnd))
perf_npe_36mts_cold <- subset(perf_npe_36mts, MarketActivity == "Cold",
        select=c(BHAR36mnd, CAR36mnd))

```

```

#PE
perf_pe_12mts <- subset(returndata12mts, Definition == "PE",
                        select=c(Country, Industry, MarketActivity, Ranking, McapAtOffer, M
                        EquityRanking, OfferTolstClose,
BHAR12mnd, CAR12mnd))
perf_pe_24mts <- subset(returndata24mts, Definition == "PE",
                        select=c(Country, Industry, MarketActivity, Ranking, McapAtOffer, M
                        EquityRanking, OfferTolstClose,
BHAR24mnd, CAR24mnd))
perf_pe_36mts <- subset(returndata36mts, Definition == "PE",
                        select=c(Country, Industry, MarketActivity, Ranking, McapAtOffer, M
                        EquityRanking, OfferTolstClose,
BHAR36mnd, CAR36mnd))
perf_pe_12mts_hot <- subset(perf_pe_12mts, MarketActivity == "Hot",
                            select=c(BHAR12mnd, CAR12mnd))
perf_pe_12mts_cold <- subset(perf_pe_12mts, MarketActivity == "Cold",
                             select=c(BHAR12mnd, CAR12mnd))
perf_pe_24mts_hot <- subset(perf_pe_24mts, MarketActivity == "Hot",
                             select=c(BHAR24mnd, CAR24mnd))
perf_pe_24mts_cold <- subset(perf_pe_24mts, MarketActivity == "Cold",
                              select=c(BHAR24mnd, CAR24mnd))
perf_pe_36mts_hot <- subset(perf_pe_36mts, MarketActivity == "Hot",
                             select=c(BHAR36mnd, CAR36mnd))
perf_pe_36mts_cold <- subset(perf_pe_36mts, MarketActivity == "Cold",
                              select=c(BHAR36mnd, CAR36mnd))

#VC
perf_vc_12mts <- subset(returndata12mts, Definition == "VC",
                        select=c(Country, Industry, MarketActivity, Ranking, McapAtOffer, M
                        EquityRanking, OfferTolstClose, BHAR12mnd,
CAR12mnd))
perf_vc_24mts <- subset(returndata24mts, Definition == "VC",
                        select=c(Country, Industry, MarketActivity, Ranking, McapAtOffer, M
                        EquityRanking, OfferTolstClose, BHAR24mnd,
CAR24mnd))
perf_vc_36mts <- subset(returndata36mts, Definition == "VC",
                        select=c(Country, Industry, MarketActivity, Ranking, McapAtOffer, M
                        EquityRanking, OfferTolstClose, BHAR36mnd,
CAR36mnd))
perf_vc_12mts_hot <- subset(perf_vc_12mts, MarketActivity == "Hot",
                             select=c(BHAR12mnd, CAR12mnd))
perf_vc_12mts_cold <- subset(perf_vc_12mts, MarketActivity == "Cold",
                              select=c(BHAR12mnd, CAR12mnd))
perf_vc_24mts_hot <- subset(perf_vc_24mts, MarketActivity == "Hot",
                              select=c(BHAR24mnd, CAR24mnd))
perf_vc_24mts_cold <- subset(perf_vc_24mts, MarketActivity == "Cold",
                              select=c(BHAR24mnd, CAR24mnd))
perf_vc_36mts_hot <- subset(perf_vc_36mts, MarketActivity == "Hot",
                              select=c(BHAR36mnd, CAR36mnd))
perf_vc_36mts_cold <- subset(perf_vc_36mts, MarketActivity == "Cold",
                              select=c(BHAR36mnd, CAR36mnd))

#DIFFERENTIATING BY COUNTRY

```

```

#US
perf_us_12mts <- subset(returndata12mts, Country == "US",
                        select=c(Definition, Industry, MarketActivity,
Ranking, McapAtOffer ,McapRanking, EquitySold,
                                EquityRanking, OfferTolstClose, BHAR12mnd,
CAR12mnd))

perf_us_24mts <- subset(returndata24mts, Country == "US",
                        select=c(Definition, Industry, MarketActivity,
Ranking, McapAtOffer ,McapRanking, EquitySold,
                                EquityRanking, OfferTolstClose, BHAR24mnd,
CAR24mnd))

perf_us_36mts <- subset(returndata36mts, Country == "US",
                        select=c(Definition, Industry, MarketActivity,
Ranking, McapAtOffer ,McapRanking, EquitySold,
                                EquityRanking, OfferTolstClose, BHAR36mnd,
CAR36mnd))

#LN
perf_ln_12mts <- subset(returndata12mts, Country == "LN",
                        select=c(Definition, Industry, MarketActivity,
Ranking, McapAtOffer ,McapRanking, EquitySold,
                                EquityRanking, OfferTolstClose, BHAR12mnd,
CAR12mnd))

perf_ln_24mts <- subset(returndata24mts, Country == "LN",
                        select=c(Definition, Industry, MarketActivity,
Ranking, McapAtOffer ,McapRanking, EquitySold,
                                EquityRanking, OfferTolstClose, BHAR24mnd,
CAR24mnd))

perf_ln_36mts <- subset(returndata36mts, Country == "LN",
                        select=c(Definition, Industry, MarketActivity,
Ranking, McapAtOffer ,McapRanking, EquitySold,
                                EquityRanking, OfferTolstClose, BHAR36mnd,
CAR36mnd))

#DIFFERENTIATING BY INDUSTRY

#Basic Materials
perf_12mts_basicmaterials <- subset(returndata12mts, Industry ==
"BasicMaterials",
                                select=c(Country, Definition,
MarketActivity, Ranking, McapAtOffer,McapRanking,
                                OfferTolstClose, EquitySold,
EquityRanking, BHAR12mnd, CAR12mnd))

perf_24mts_basicmaterials <- subset(returndata24mts, Industry ==
"BasicMaterials",
                                select=c(Country, Definition,
MarketActivity, Ranking, McapAtOffer,McapRanking,
                                OfferTolstClose, EquitySold,
EquityRanking, BHAR24mnd, CAR24mnd))

perf_36mts_basicmaterials <- subset(returndata36mts, Industry ==
"BasicMaterials",

```

```

                                select=c(Country, Definition,
MarketActivity, Ranking, McapAtOffer, McapRanking,
                                OfferTolstClose, EquitySold,
EquityRanking, BHAR36mnd, CAR36mnd))

#Communications
perf_12mts_Communications <- subset( returndata12mts, Industry ==
"Communications",
                                select=c(Country, Definition,
MarketActivity, Ranking, McapAtOffer, McapRanking,
                                OfferTolstClose, EquitySold,
EquityRanking, BHAR12mnd, CAR12mnd))

perf_24mts_Communications <- subset( returndata24mts, Industry ==
"Communications",
                                select=c(Country, Definition,
MarketActivity, Ranking, McapAtOffer, McapRanking,
                                OfferTolstClose, EquitySold,
EquityRanking, BHAR24mnd, CAR24mnd))

perf_36mts_Communications <- subset( returndata36mts, Industry ==
"Communications",
                                select=c(Country, Definition,
MarketActivity, Ranking, McapAtOffer, McapRanking,
                                OfferTolstClose, EquitySold,
EquityRanking, BHAR36mnd, CAR36mnd))

#ConsumerCyclical
perf_12mts_ConsumerCyclical <- subset( returndata12mts, Industry ==
"ConsumerCyclical",
                                select=c(Country, Definition,
MarketActivity, Ranking, McapAtOffer, McapRanking,
                                OfferTolstClose, EquitySold,
EquityRanking, BHAR12mnd, CAR12mnd))

perf_24mts_ConsumerCyclical <- subset( returndata24mts, Industry ==
"ConsumerCyclical",
                                select=c(Country, Definition,
MarketActivity, Ranking, McapAtOffer, McapRanking,
                                OfferTolstClose, EquitySold,
EquityRanking, BHAR24mnd, CAR24mnd))

perf_36mts_ConsumerCyclical <- subset( returndata36mts, Industry ==
"ConsumerCyclical",
                                select=c(Country, Definition,
MarketActivity, Ranking, McapAtOffer, McapRanking,
                                OfferTolstClose, EquitySold,
EquityRanking, BHAR36mnd, CAR36mnd))

#ConsumerNonCyclical
perf_12mts_ConsumerNonCyclical <- subset( returndata12mts, Industry ==
"ConsumerNonCyclical",
                                select=c(Country, Definition,
MarketActivity, Ranking, McapAtOffer, McapRanking,
                                OfferTolstClose, EquitySold,
EquityRanking, BHAR12mnd, CAR12mnd))

```



```
perf_24mts_ConsumerNonCyclical <- subset(returndata24mts, Industry ==  
"ConsumerNonCyclical",  
                                     select=c(Country, Definition,  
MarketActivity, Ranking, McapAtOffer, McapRanking,  
                                               OfferTolstClose, EquitySold,  
EquityRanking, BHAR24mnd, CAR24mnd))
```

```
perf_36mts_ConsumerNonCyclical <- subset(returndata36mts, Industry ==  
"ConsumerNonCyclical",  
                                     select=c(Country, Definition,  
MarketActivity, Ranking, McapAtOffer, McapRanking,  
                                               OfferTolstClose, EquitySold,  
EquityRanking, BHAR36mnd, CAR36mnd))
```

```
#Energy
```

```
perf_12mts_Energy <- subset(returndata12mts, Industry == "Energy",  
                            select=c(Country, Definition,  
MarketActivity, Ranking, McapAtOffer, McapRanking,  
                                OfferTolstClose,  
EquitySold, EquityRanking, BHAR12mnd, CAR12mnd))
```

```
perf_24mts_Energy <- subset(returndata24mts, Industry == "Energy",  
                            select=c(Country, Definition,  
MarketActivity, Ranking, McapAtOffer, McapRanking,  
                                OfferTolstClose,  
EquitySold, EquityRanking, BHAR24mnd, CAR24mnd))
```

```
perf_36mts_Energy <- subset(returndata36mts, Industry == "Energy",  
                            select=c(Country, Definition,  
MarketActivity, Ranking, McapAtOffer, McapRanking,  
                                OfferTolstClose,  
EquitySold, EquityRanking, BHAR36mnd, CAR36mnd))
```

```
#Financial
```

```
perf_12mts_Financial <- subset(returndata12mts, Industry == "Financial",  
                               select=c(Country, Definition, MarketActivity,  
Ranking, McapAtOffer, McapRanking,  
                               OfferTolstClose, EquitySold,  
EquityRanking, BHAR12mnd, CAR12mnd))
```

```
perf_24mts_Financial <- subset(returndata24mts, Industry == "Financial",  
                               select=c(Country, Definition, MarketActivity,  
Ranking, McapAtOffer, McapRanking,  
                               OfferTolstClose, EquitySold,  
EquityRanking, BHAR24mnd, CAR24mnd))
```

```
perf_36mts_Financial <- subset(returndata36mts, Industry == "Financial",  
                               select=c(Country, Definition, MarketActivity,  
Ranking, McapAtOffer, McapRanking,  
                               OfferTolstClose, EquitySold,  
EquityRanking, BHAR36mnd, CAR36mnd))
```

```
#Technology
```

```
perf_12mts_Technology <- subset(returndata12mts, Industry == "Technology",
```

```

        select=c(Country, Definition,
MarketActivity, Ranking, McapAtOffer, McapRanking,
        OfferTolstClose, EquitySold,
EquityRanking, BHAR12mnd, CAR12mnd))

perf_24mts_Technology <- subset( returndata24mts, Industry == "Technology",
        select=c(Country, Definition,
MarketActivity, Ranking, McapAtOffer, McapRanking,
        OfferTolstClose, EquitySold,
EquityRanking, BHAR24mnd, CAR24mnd))

perf_36mts_Technology <- subset( returndata36mts, Industry == "Technology",
        select=c(Country, Definition,
MarketActivity, Ranking, McapAtOffer, McapRanking,
        OfferTolstClose, EquitySold,
EquityRanking, BHAR36mnd, CAR36mnd))

#Industrial
perf_12mts_Industrial <- subset( returndata12mts, Industry == "Industrial",
        select=c(Country, Definition,
MarketActivity, Ranking, McapAtOffer, McapRanking,
        OfferTolstClose, EquitySold,
EquityRanking, BHAR12mnd, CAR12mnd))

perf_24mts_Industrial <- subset( returndata24mts, Industry == "Industrial",
        select=c(Country, Definition,
MarketActivity, Ranking, McapAtOffer, McapRanking,
        OfferTolstClose, EquitySold,
EquityRanking, BHAR24mnd, CAR24mnd))

perf_36mts_Industrial <- subset( returndata36mts, Industry == "Industrial",
        select=c(Country, Definition,
MarketActivity, Ranking, McapAtOffer, McapRanking,
        OfferTolstClose, EquitySold,
EquityRanking, BHAR36mnd, CAR36mnd))

#Utilities
perf_12mts_Utilities <- subset( returndata12mts, Industry == "Utilities",
        select=c(Country, Definition,
MarketActivity, Ranking, McapAtOffer, McapRanking,
        OfferTolstClose, EquitySold,
EquityRanking, BHAR12mnd, CAR12mnd))

perf_24mts_Utilities <- subset( returndata24mts, Industry == "Utilities",
        select=c(Country, Definition,
MarketActivity, Ranking, McapAtOffer, McapRanking,
        OfferTolstClose, EquitySold,
EquityRanking, BHAR24mnd, CAR24mnd))

perf_36mts_Utilities <- subset( returndata36mts, Industry == "Utilities",
        select=c(Country, Definition,
MarketActivity, Ranking, McapAtOffer, McapRanking,
        OfferTolstClose, EquitySold,
EquityRanking, BHAR36mnd, CAR36mnd))

# MAKING DATA SET FOR MARKETCAP RANKING
perf_12mts_Mcap_high <- subset( returndata12mts, McapRanking == "High",

```

```

                                select=c(Country, Definition, Industry,
MarketActivity, Ranking, McapAtOffer,
                                OfferTolstClose, EquitySold,
EquityRanking, BHAR12mnd, CAR12mnd))

perf_24mts_Mcap_high <- subset(returndata24mts, McapRanking == "High",
                                select=c(Country, Definition, Industry,
MarketActivity, Ranking, McapAtOffer,
                                OfferTolstClose, EquitySold,
EquityRanking, BHAR24mnd, CAR24mnd))

perf_36mts_Mcap_high <- subset(returndata36mts, McapRanking == "High",
                                select=c(Country, Definition, Industry,
MarketActivity, Ranking, McapAtOffer,
                                OfferTolstClose, EquitySold,
EquityRanking, BHAR36mnd, CAR36mnd))

perf_12mts_Mcap_med <- subset(returndata12mts, McapRanking == "Medium",
                                select=c(Country, Definition, Industry,
MarketActivity, Ranking, McapAtOffer,
                                OfferTolstClose, EquitySold,
EquityRanking, BHAR12mnd, CAR12mnd))

perf_24mts_Mcap_med <- subset(returndata24mts, McapRanking == "Medium",
                                select=c(Country, Definition, Industry,
MarketActivity, Ranking, McapAtOffer,
                                OfferTolstClose, EquitySold,
EquityRanking, BHAR24mnd, CAR24mnd))

perf_36mts_Mcap_med <- subset(returndata36mts, McapRanking == "Medium",
                                select=c(Country, Definition, Industry,
MarketActivity, Ranking, McapAtOffer,
                                OfferTolstClose, EquitySold,
EquityRanking, BHAR36mnd, CAR36mnd))

perf_12mts_Mcap_low <- subset(returndata12mts, McapRanking == "Low",
                                select=c(Country, Definition, Industry,
MarketActivity, Ranking, McapAtOffer,
                                OfferTolstClose, EquitySold,
EquityRanking, BHAR12mnd, CAR12mnd))

perf_24mts_Mcap_low <- subset(returndata24mts, McapRanking == "Low",
                                select=c(Country, Definition, Industry,
MarketActivity, Ranking, McapAtOffer,
                                OfferTolstClose, EquitySold,
EquityRanking, BHAR24mnd, CAR24mnd))

perf_36mts_Mcap_low <- subset(returndata36mts, McapRanking == "Low",
                                select=c(Country, Definition, Industry,
MarketActivity, Ranking, McapAtOffer,
                                OfferTolstClose, EquitySold,
EquityRanking, BHAR36mnd, CAR36mnd))

# MAKING DATA SET FOR EQUITY RANKING
perf_12mts_Eq_high <- subset(returndata12mts, EquityRanking == "High",
                                select=c(Country, Definition, Industry,
MarketActivity, Ranking, McapAtOffer,

```

```

OfferTolstClose, EquitySold,
McapRanking, BHAR12mnd, CAR12mnd))

perf_24mts_Eq_high <- subset(returndata24mts, EquityRanking == "High",
                             select=c(Country, Definition, Industry,
MarketActivity, Ranking, McapAtOffer,
OfferTolstClose, EquitySold,
McapRanking, BHAR24mnd, CAR24mnd))

perf_36mts_Eq_high <- subset(returndata36mts, EquityRanking == "High",
                             select=c(Country, Definition, Industry,
MarketActivity, Ranking, McapAtOffer,
OfferTolstClose, EquitySold,
McapRanking, BHAR36mnd, CAR36mnd))

perf_12mts_Eq_med <- subset(returndata12mts, EquityRanking == "Medium",
                             select=c(Country, Definition, Industry,
MarketActivity, Ranking, McapAtOffer,
OfferTolstClose, EquitySold,
McapRanking, BHAR12mnd, CAR12mnd))

perf_24mts_Eq_med <- subset(returndata24mts, EquityRanking == "Medium",
                             select=c(Country, Definition, Industry,
MarketActivity, Ranking, McapAtOffer,
OfferTolstClose, EquitySold,
McapRanking, BHAR24mnd, CAR24mnd))

perf_36mts_Eq_med <- subset(returndata36mts, EquityRanking == "Medium",
                             select=c(Country, Definition, Industry,
MarketActivity, Ranking, McapAtOffer,
OfferTolstClose, EquitySold,
McapRanking, BHAR36mnd, CAR36mnd))

perf_12mts_Eq_low <- subset(returndata12mts, EquityRanking == "Low",
                             select=c(Country, Definition, Industry,
MarketActivity, Ranking, McapAtOffer,
OfferTolstClose, EquitySold,
McapRanking, BHAR12mnd, CAR12mnd))

perf_24mts_Eq_low <- subset(returndata24mts, EquityRanking == "Low",
                             select=c(Country, Definition, Industry,
MarketActivity, Ranking, McapAtOffer,
OfferTolstClose, EquitySold,
McapRanking, BHAR24mnd, CAR24mnd))

perf_36mts_Eq_low <- subset(returndata36mts, EquityRanking == "Low",
                             select=c(Country, Definition, Industry,
MarketActivity, Ranking, McapAtOffer,
OfferTolstClose, EquitySold,
McapRanking, BHAR36mnd, CAR36mnd))

```

```
##### STATISTICS AND TESTING PERFORMANCE #####
```

```
#Checking normality of data PENDING
```

```
# TESTING DIFFERENCES IN MEDIAN FOR ALL
```

```

#BHAR
wilcox_12mts_bhar_all <- wilcox.test(returndata12mts$BHAR12mnd)
median_12mts_bhar_all <- median(returndata12mts$BHAR12mnd)
head(wilcox_12mts_bhar_all)
head(median_12mts_bhar_all)

wilcox_24mts_bhar_all <- wilcox.test(returndata24mts$BHAR24mnd)
median_24mts_bhar_all <- median(returndata24mts$BHAR24mnd)
head(wilcox_24mts_bhar_all)
head(median_24mts_bhar_all)

wilcox_36mts_bhar_all <- wilcox.test(returndata36mts$BHAR36mnd)
median_36mts_bhar_all <- median(returndata36mts$BHAR36mnd)
head(wilcox_36mts_bhar_all)
head(median_36mts_bhar_all)

#CAR
wilcox_12mts_car_all <- wilcox.test(returndata12mts$CAR12mnd)
median_12mts_car_all <- median(returndata12mts$CAR12mnd)
head(wilcox_12mts_car_all)
head(median_12mts_car_all)

wilcox_24mts_car_all <- wilcox.test(returndata24mts$CAR24mnd)
median_24mts_car_all <- median(returndata24mts$CAR24mnd)
head(wilcox_24mts_car_all)
head(median_24mts_car_all)

wilcox_36mts_car_all <- wilcox.test(returndata36mts$CAR36mnd)
median_36mts_car_all <- median(returndata36mts$CAR36mnd)
head(wilcox_36mts_car_all)
head(median_36mts_car_all)

# TESTING DIFFERENCES IN MEDIAN FOR NPE

#BHAR
wilcox_12mts_bhar_npe <- wilcox.test(perf_npe_12mts$BHAR12mnd)
median_12mts_bhar_npe <- median(perf_npe_12mts$BHAR12mnd)
head(wilcox_12mts_bhar_npe)
head(median_12mts_bhar_npe)

wilcox_24mts_bhar_npe <- wilcox.test(perf_npe_24mts$BHAR24mnd)
median_24mts_bhar_npe <- median(perf_npe_24mts$BHAR24mnd)
head(wilcox_24mts_bhar_npe)
head(median_24mts_bhar_npe)

wilcox_36mts_bhar_npe <- wilcox.test(perf_npe_36mts$BHAR36mnd)
median_36mts_bhar_npe <- median(perf_npe_36mts$BHAR36mnd)
head(wilcox_36mts_bhar_npe)
head(median_36mts_bhar_npe)

#CAR
wilcox_12mts_car_npe <- wilcox.test(perf_npe_12mts$CAR12mnd)
median_12mts_car_npe <- median(perf_npe_12mts$CAR12mnd)
head(wilcox_12mts_car_npe)

```

```

head(median_12mts_car_npe)

wilcox_24mts_car_npe <- wilcox.test(perf_npe_24mts$CAR24mnd)
median_24mts_car_npe <- median(perf_npe_24mts$CAR24mnd)
head(wilcox_24mts_car_npe)
head(median_24mts_car_npe)

wilcox_36mts_car_npe <- wilcox.test(perf_npe_36mts$CAR36mnd)
median_36mts_car_npe <- median(perf_npe_36mts$CAR36mnd)
head(wilcox_36mts_car_npe)
head(median_36mts_car_npe)

# TESTING DIFFERENCES IN MEDIAN FOR PE

#BHAR
wilcox_12mts_bhar_pe <- wilcox.test(perf_pe_12mts$BHAR12mnd)
median_12mts_bhar_pe <- median(perf_pe_12mts$BHAR12mnd)
head(wilcox_12mts_bhar_pe)
head(median_12mts_bhar_pe)

wilcox_24mts_bhar_pe <- wilcox.test(perf_pe_24mts$BHAR24mnd)
median_24mts_bhar_pe <- median(perf_pe_24mts$BHAR24mnd)
head(wilcox_24mts_bhar_pe)
head(median_24mts_bhar_pe)

wilcox_36mts_bhar_pe <- wilcox.test(perf_pe_36mts$BHAR36mnd)
median_36mts_bhar_pe <- median(perf_pe_36mts$BHAR36mnd)
head(wilcox_36mts_bhar_pe)
head(median_36mts_bhar_pe)

#CAR
wilcox_12mts_car_pe <- wilcox.test(perf_pe_12mts$CAR12mnd)
median_12mts_car_pe <- median(perf_pe_12mts$CAR12mnd)
head(wilcox_12mts_car_pe)
head(median_12mts_car_pe)

wilcox_24mts_car_pe <- wilcox.test(perf_pe_24mts$CAR24mnd)
median_24mts_car_pe <- median(perf_pe_24mts$CAR24mnd)
head(wilcox_24mts_car_pe)
head(median_24mts_car_pe)

wilcox_36mts_car_pe <- wilcox.test(perf_pe_36mts$CAR36mnd)
median_36mts_car_pe <- median(perf_pe_36mts$CAR36mnd)
head(wilcox_36mts_car_pe)
head(median_36mts_car_pe)

# TESTING DIFFERENCES IN MEDIAN FOR VC

#BHAR
wilcox_12mts_bhar_vc <- wilcox.test(perf_vc_12mts$BHAR12mnd)
median_12mts_bhar_vc <- median(perf_vc_12mts$BHAR12mnd)
head(wilcox_12mts_bhar_vc)
head(median_12mts_bhar_vc)

```

```
wilcox_24mts_bhar_vc <- wilcox.test(perf_vc_24mts$BHAR24mnd)
median_24mts_bhar_vc <- median(perf_vc_24mts$BHAR24mnd)
head(wilcox_24mts_bhar_vc)
head(median_24mts_bhar_vc)
```

```
wilcox_36mts_bhar_vc <- wilcox.test(perf_vc_36mts$BHAR36mnd)
median_36mts_bhar_vc <- median(perf_vc_36mts$BHAR36mnd)
head(wilcox_36mts_bhar_vc)
head(median_36mts_bhar_vc)
```

```
#CAR
```

```
wilcox_12mts_car_vc <- wilcox.test(perf_vc_12mts$CAR12mnd)
median_12mts_car_vc <- median(perf_vc_12mts$CAR12mnd)
head(wilcox_12mts_car_vc)
head(median_12mts_car_vc)
```

```
wilcox_24mts_car_vc <- wilcox.test(perf_vc_24mts$CAR24mnd)
median_24mts_car_vc <- median(perf_vc_24mts$CAR24mnd)
head(wilcox_24mts_car_vc)
head(median_24mts_car_vc)
```

```
wilcox_36mts_car_vc <- wilcox.test(perf_vc_36mts$CAR36mnd)
median_36mts_car_vc <- median(perf_vc_36mts$CAR36mnd)
head(wilcox_36mts_car_vc)
head(median_36mts_car_vc)
```

```
# TESTING DIFFERENCES IN MEDIANS BETWEEN SPONSORS
```

```
#BHAR-12mts
```

```
wilcox_npe_pe_bhar12mts <-
wilcox.test(perf_npe_12mts$BHAR12mnd,perf_pe_12mts$BHAR12mnd)
head(wilcox_npe_pe_bhar12mts)
```

```
wilcox_npe_vc_bhar12mts <-
wilcox.test(perf_npe_12mts$BHAR12mnd,perf_vc_12mts$BHAR12mnd)
head(wilcox_npe_vc_bhar12mts)
```

```
wilcox_pe_vc_bhar12mts <-
wilcox.test(perf_pe_12mts$BHAR12mnd,perf_vc_12mts$BHAR12mnd)
head(wilcox_pe_vc_bhar12mts)
```

```
#BHAR-24mts
```

```
wilcox_npe_pe_bhar24mts <-
wilcox.test(perf_npe_24mts$BHAR24mnd,perf_pe_24mts$BHAR24mnd)
head(wilcox_npe_pe_bhar24mts)
```

```
wilcox_npe_vc_bhar24mts <-
wilcox.test(perf_npe_24mts$BHAR24mnd,perf_vc_24mts$BHAR24mnd)
head(wilcox_npe_vc_bhar24mts)
```

```
wilcox_pe_vc_bhar24mts <-
wilcox.test(perf_pe_24mts$BHAR24mnd,perf_vc_24mts$BHAR24mnd)
head(wilcox_pe_vc_bhar24mts)
```

```

#BHAR-36mts
wilcox_npe_pe_bhar36mts <-
wilcox.test(perf_npe_36mts$BHAR36mnd,perf_pe_36mts$BHAR36mnd)
head(wilcox_npe_pe_bhar36mts)

wilcox_npe_vc_bhar36mts <-
wilcox.test(perf_npe_36mts$BHAR36mnd,perf_vc_36mts$BHAR36mnd)
head(wilcox_npe_vc_bhar36mts)

wilcox_pe_vc_bhar36mts <-
wilcox.test(perf_pe_36mts$BHAR36mnd,perf_vc_36mts$BHAR36mnd)
head(wilcox_pe_vc_bhar36mts)

#CAR-12mts
wilcox_npe_pe_car12mts <-
wilcox.test(perf_npe_12mts$CAR12mnd,perf_pe_12mts$CAR12mnd)
head(wilcox_npe_pe_car12mts)

wilcox_npe_vc_car12mts <-
wilcox.test(perf_npe_12mts$CAR12mnd,perf_vc_12mts$CAR12mnd)
head(wilcox_npe_vc_car12mts)

wilcox_pe_vc_car12mts <-
wilcox.test(perf_pe_12mts$CAR12mnd,perf_vc_12mts$CAR12mnd)
head(wilcox_pe_vc_car12mts)

#CAR-24mts
wilcox_npe_pe_car24mts <-
wilcox.test(perf_npe_24mts$CAR24mnd,perf_pe_24mts$CAR24mnd)
head(wilcox_npe_pe_car24mts)

wilcox_npe_vc_car24mts <-
wilcox.test(perf_npe_24mts$CAR24mnd,perf_vc_24mts$CAR24mnd)
head(wilcox_npe_vc_car24mts)

wilcox_pe_vc_car24mts <-
wilcox.test(perf_pe_24mts$CAR24mnd,perf_vc_24mts$CAR24mnd)
head(wilcox_pe_vc_car24mts)

#CAR-36mts
wilcox_npe_pe_car36mts <-
wilcox.test(perf_npe_36mts$CAR36mnd,perf_pe_36mts$CAR36mnd)
head(wilcox_npe_pe_car36mts)

wilcox_npe_vc_car36mts <-
wilcox.test(perf_npe_36mts$CAR36mnd,perf_vc_36mts$CAR36mnd)
head(wilcox_npe_vc_car36mts)

wilcox_pe_vc_car36mts <-
wilcox.test(perf_pe_36mts$CAR36mnd,perf_vc_36mts$CAR36mnd)
head(wilcox_pe_vc_car36mts)

# TESTING IF BHAR/CAR IS SIGN NORMAL HOT/COLD

#HOT- BHAR
wilcox_12mts_bhar_all_hot <- wilcox.test(perf_all_12mts_hot$BHAR12mnd)
median_12mts_bhar_all_hot <- median(perf_all_12mts_hot$BHAR12mnd)

```



```

head(wilcox_12mts_bhar_all_hot)
head(median_12mts_bhar_all_hot)

wilcox_24mts_bhar_all_hot <- wilcox.test(perf_all_24mts_hot$BHAR24mnd)
median_24mts_bhar_all_hot <- median(perf_all_24mts_hot$BHAR24mnd)
head(wilcox_24mts_bhar_all_hot)
head(median_24mts_bhar_all_hot)

wilcox_36mts_bhar_all_hot <- wilcox.test(perf_all_36mts_hot$BHAR36mnd)
median_36mts_bhar_all_hot <- median(perf_all_36mts_hot$BHAR36mnd)
head(wilcox_36mts_bhar_all_hot)
head(median_36mts_bhar_all_hot)

#HOT- CAR
wilcox_12mts_car_all_hot <- wilcox.test(perf_all_12mts_hot$CAR12mnd)
median_12mts_car_all_hot <- median(perf_all_12mts_hot$CAR12mnd)
head(wilcox_12mts_car_all_hot)
head(median_12mts_car_all_hot)

wilcox_24mts_car_all_hot <- wilcox.test(perf_all_24mts_hot$CAR24mnd)
median_24mts_car_all_hot <- median(perf_all_24mts_hot$CAR24mnd)
head(wilcox_24mts_car_all_hot)
head(median_24mts_car_all_hot)

wilcox_36mts_car_all_hot <- wilcox.test(perf_all_36mts_hot$CAR36mnd)
median_36mts_car_all_hot <- median(perf_all_36mts_hot$CAR36mnd)
head(wilcox_36mts_car_all_hot)
head(median_36mts_car_all_hot)

#COLD- BHAR
wilcox_12mts_bhar_all_cold <- wilcox.test(perf_all_12mts_cold$BHAR12mnd)
median_12mts_bhar_all_cold <- median(perf_all_12mts_cold$BHAR12mnd)
head(wilcox_12mts_bhar_all_cold)
head(median_12mts_bhar_all_cold)

wilcox_24mts_bhar_all_cold <- wilcox.test(perf_all_24mts_cold$BHAR24mnd)
median_24mts_bhar_all_cold <- median(perf_all_24mts_cold$BHAR24mnd)
head(wilcox_24mts_bhar_all_cold)
head(median_24mts_bhar_all_cold)

wilcox_36mts_bhar_all_cold <- wilcox.test(perf_all_36mts_cold$BHAR36mnd)
median_36mts_bhar_all_cold <- median(perf_all_36mts_cold$BHAR36mnd)
head(wilcox_36mts_bhar_all_cold)
head(median_36mts_bhar_all_cold)

#COLD- CAR
wilcox_12mts_car_all_cold <- wilcox.test(perf_all_12mts_cold$CAR12mnd)
median_12mts_car_all_cold <- median(perf_all_12mts_cold$CAR12mnd)
head(wilcox_12mts_car_all_cold)
head(median_12mts_car_all_cold)

wilcox_24mts_car_all_cold <- wilcox.test(perf_all_24mts_cold$CAR24mnd)
median_24mts_car_all_cold <- median(perf_all_24mts_cold$CAR24mnd)
head(wilcox_24mts_car_all_cold)
head(median_24mts_car_all_cold)

wilcox_36mts_car_all_cold <- wilcox.test(perf_all_36mts_cold$CAR36mnd)
median_36mts_car_all_cold <- median(perf_all_36mts_cold$CAR36mnd)

```

```

head(wilcox_36mts_car_all_cold)
head(median_36mts_car_all_cold)

#HOT- BHAR
wilcox_12mts_bhar_npe_hot <- wilcox.test(perf_npe_12mts_hot$BHAR12mnd)
median_12mts_bhar_npe_hot <- median(perf_npe_12mts_hot$BHAR12mnd)
head(wilcox_12mts_bhar_npe_hot)
head(median_12mts_bhar_npe_hot)

wilcox_24mts_bhar_npe_hot <- wilcox.test(perf_npe_24mts_hot$BHAR24mnd)
median_24mts_bhar_npe_hot <- median(perf_npe_24mts_hot$BHAR24mnd)
head(wilcox_24mts_bhar_npe_hot)
head(median_24mts_bhar_npe_hot)

wilcox_36mts_bhar_npe_hot <- wilcox.test(perf_npe_36mts_hot$BHAR36mnd)
median_36mts_bhar_npe_hot <- median(perf_npe_36mts_hot$BHAR36mnd)
head(wilcox_36mts_bhar_npe_hot)
head(median_36mts_bhar_npe_hot)

#HOT- CAR
wilcox_12mts_car_npe_hot <- wilcox.test(perf_npe_12mts_hot$CAR12mnd)
median_12mts_car_npe_hot <- median(perf_npe_12mts_hot$CAR12mnd)
head(wilcox_12mts_car_npe_hot)
head(median_12mts_car_npe_hot)

wilcox_24mts_car_npe_hot <- wilcox.test(perf_npe_24mts_hot$CAR24mnd)
median_24mts_car_npe_hot <- median(perf_npe_24mts_hot$CAR24mnd)
head(wilcox_24mts_car_npe_hot)
head(median_24mts_car_npe_hot)

wilcox_36mts_car_npe_hot <- wilcox.test(perf_npe_36mts_hot$CAR36mnd)
median_36mts_car_npe_hot <- median(perf_npe_36mts_hot$CAR36mnd)
head(wilcox_36mts_car_npe_hot)
head(median_36mts_car_npe_hot)

#COLD- BHAR
wilcox_12mts_bhar_npe_cold <- wilcox.test(perf_npe_12mts_cold$BHAR12mnd)
median_12mts_bhar_npe_cold <- median(perf_npe_12mts_cold$BHAR12mnd)
head(wilcox_12mts_bhar_npe_cold)
head(median_12mts_bhar_npe_cold)

wilcox_24mts_bhar_npe_cold <- wilcox.test(perf_npe_24mts_cold$BHAR24mnd)
median_24mts_bhar_npe_cold <- median(perf_npe_24mts_cold$BHAR24mnd)
head(wilcox_24mts_bhar_npe_cold)
head(median_24mts_bhar_npe_cold)

wilcox_36mts_bhar_npe_cold <- wilcox.test(perf_npe_36mts_cold$BHAR36mnd)
median_36mts_bhar_npe_cold <- median(perf_npe_36mts_cold$BHAR36mnd)
head(wilcox_36mts_bhar_npe_cold)
head(median_36mts_bhar_npe_cold)

#COLD- CAR
wilcox_12mts_car_npe_cold <- wilcox.test(perf_npe_12mts_cold$CAR12mnd)
median_12mts_car_npe_cold <- median(perf_npe_12mts_cold$CAR12mnd)
head(wilcox_12mts_car_npe_cold)
head(median_12mts_car_npe_cold)

wilcox_24mts_car_npe_cold <- wilcox.test(perf_npe_24mts_cold$CAR24mnd)

```

```

median_24mts_car_npe_cold <- median(perf_npe_24mts_cold$CAR24mnd)
head(wilcox_24mts_car_npe_cold)
head(median_24mts_car_npe_cold)

wilcox_36mts_car_npe_cold <- wilcox.test(perf_npe_36mts_cold$CAR36mnd)
median_36mts_car_npe_cold <- median(perf_npe_36mts_cold$CAR36mnd)
head(wilcox_36mts_car_npe_cold)
head(median_36mts_car_npe_cold)

#HOT- BHAR
wilcox_12mts_bhar_pe_hot <- wilcox.test(perf_pe_12mts_hot$BHAR12mnd)
median_12mts_bhar_pe_hot <- median(perf_pe_12mts_hot$BHAR12mnd)
head(wilcox_12mts_bhar_pe_hot)
head(median_12mts_bhar_pe_hot)

wilcox_24mts_bhar_pe_hot <- wilcox.test(perf_pe_24mts_hot$BHAR24mnd)
median_24mts_bhar_pe_hot <- median(perf_pe_24mts_hot$BHAR24mnd)
head(wilcox_24mts_bhar_pe_hot)
head(median_24mts_bhar_pe_hot)

wilcox_36mts_bhar_pe_hot <- wilcox.test(perf_pe_36mts_hot$BHAR36mnd)
median_36mts_bhar_pe_hot <- median(perf_pe_36mts_hot$BHAR36mnd)
head(wilcox_36mts_bhar_pe_hot)
head(median_36mts_bhar_pe_hot)

#HOT- CAR
wilcox_12mts_car_pe_hot <- wilcox.test(perf_pe_12mts_hot$CAR12mnd)
median_12mts_car_pe_hot <- median(perf_pe_12mts_hot$CAR12mnd)
head(wilcox_12mts_car_pe_hot)
head(median_12mts_car_pe_hot)

wilcox_24mts_car_pe_hot <- wilcox.test(perf_pe_24mts_hot$CAR24mnd)
median_24mts_car_pe_hot <- median(perf_pe_24mts_hot$CAR24mnd)
head(wilcox_24mts_car_pe_hot)
head(median_24mts_car_pe_hot)

wilcox_36mts_car_pe_hot <- wilcox.test(perf_pe_36mts_hot$CAR36mnd)
median_36mts_car_pe_hot <- median(perf_pe_36mts_hot$CAR36mnd)
head(wilcox_36mts_car_pe_hot)
head(median_36mts_car_pe_hot)

#COLD- BHAR
wilcox_12mts_bhar_pe_cold <- wilcox.test(perf_pe_12mts_cold$BHAR12mnd)
median_12mts_bhar_pe_cold <- median(perf_pe_12mts_cold$BHAR12mnd)
head(wilcox_12mts_bhar_pe_cold)
head(median_12mts_bhar_pe_cold)

wilcox_24mts_bhar_pe_cold <- wilcox.test(perf_pe_24mts_cold$BHAR24mnd)
median_24mts_bhar_pe_cold <- median(perf_pe_24mts_cold$BHAR24mnd)
head(wilcox_24mts_bhar_pe_cold)
head(median_24mts_bhar_pe_cold)

wilcox_36mts_bhar_pe_cold <- wilcox.test(perf_pe_36mts_cold$BHAR36mnd)
median_36mts_bhar_pe_cold <- median(perf_pe_36mts_cold$BHAR36mnd)
head(wilcox_36mts_bhar_pe_cold)
head(median_36mts_bhar_pe_cold)

```

```

#COLD- CAR
wilcox_12mts_car_pe_cold <- wilcox.test(perf_pe_12mts_cold$CAR12mnd)
median_12mts_car_pe_cold <- median(perf_pe_12mts_cold$CAR12mnd)
head(wilcox_12mts_car_pe_cold)
head(median_12mts_car_pe_cold)

wilcox_24mts_car_pe_cold <- wilcox.test(perf_pe_24mts_cold$CAR24mnd)
median_24mts_car_pe_cold <- median(perf_pe_24mts_cold$CAR24mnd)
head(wilcox_24mts_car_pe_cold)
head(median_24mts_car_pe_cold)

wilcox_36mts_car_pe_cold <- wilcox.test(perf_pe_36mts_cold$CAR36mnd)
median_36mts_car_pe_cold <- median(perf_pe_36mts_cold$CAR36mnd)
head(wilcox_36mts_car_pe_cold)
head(median_36mts_car_pe_cold)

#HOT- BHAR
wilcox_12mts_bhar_vc_hot <- wilcox.test(perf_vc_12mts_hot$BHAR12mnd)
median_12mts_bhar_vc_hot <- median(perf_vc_12mts_hot$BHAR12mnd)
head(wilcox_12mts_bhar_vc_hot)
head(median_12mts_bhar_vc_hot)

wilcox_24mts_bhar_vc_hot <- wilcox.test(perf_vc_24mts_hot$BHAR24mnd)
median_24mts_bhar_vc_hot <- median(perf_vc_24mts_hot$BHAR24mnd)
head(wilcox_24mts_bhar_vc_hot)
head(median_24mts_bhar_vc_hot)

wilcox_36mts_bhar_vc_hot <- wilcox.test(perf_vc_36mts_hot$BHAR36mnd)
median_36mts_bhar_vc_hot <- median(perf_vc_36mts_hot$BHAR36mnd)
head(wilcox_36mts_bhar_vc_hot)
head(median_36mts_bhar_vc_hot)

#HOT- CAR
wilcox_12mts_car_vc_hot <- wilcox.test(perf_vc_12mts_hot$CAR12mnd)
median_12mts_car_vc_hot <- median(perf_vc_12mts_hot$CAR12mnd)
head(wilcox_12mts_car_vc_hot)
head(median_12mts_car_vc_hot)

wilcox_24mts_car_vc_hot <- wilcox.test(perf_vc_24mts_hot$CAR24mnd)
median_24mts_car_vc_hot <- median(perf_vc_24mts_hot$CAR24mnd)
head(wilcox_24mts_car_vc_hot)
head(median_24mts_car_vc_hot)

wilcox_36mts_car_vc_hot <- wilcox.test(perf_vc_36mts_hot$CAR36mnd)
median_36mts_car_vc_hot <- median(perf_vc_36mts_hot$CAR36mnd)
head(wilcox_36mts_car_vc_hot)
head(median_36mts_car_vc_hot)

#COLD- BHAR
wilcox_12mts_bhar_vc_cold <- wilcox.test(perf_vc_12mts_cold$BHAR12mnd)
median_12mts_bhar_vc_cold <- median(perf_vc_12mts_cold$BHAR12mnd)
head(wilcox_12mts_bhar_vc_cold)
head(median_12mts_bhar_vc_cold)

wilcox_24mts_bhar_vc_cold <- wilcox.test(perf_vc_24mts_cold$BHAR24mnd)
median_24mts_bhar_vc_cold <- median(perf_vc_24mts_cold$BHAR24mnd)
head(wilcox_24mts_bhar_vc_cold)

```

```

head(median_24mts_bhar_vc_cold)

wilcox_36mts_bhar_vc_cold <- wilcox.test(perf_vc_36mts_cold$BHAR36mnd)
median_36mts_bhar_vc_cold <- median(perf_vc_36mts_cold$BHAR36mnd)
head(wilcox_36mts_bhar_vc_cold)
head(median_36mts_bhar_vc_cold)

#COLD- CAR
wilcox_12mts_car_vc_cold <- wilcox.test(perf_vc_12mts_cold$CAR12mnd)
median_12mts_car_vc_cold <- median(perf_vc_12mts_cold$CAR12mnd)
head(wilcox_12mts_car_vc_cold)
head(median_12mts_car_vc_cold)

wilcox_24mts_car_vc_cold <- wilcox.test(perf_vc_24mts_cold$CAR24mnd)
median_24mts_car_vc_cold <- median(perf_vc_24mts_cold$CAR24mnd)
head(wilcox_24mts_car_vc_cold)
head(median_24mts_car_vc_cold)

wilcox_36mts_car_vc_cold <- wilcox.test(perf_vc_36mts_cold$CAR36mnd)
median_36mts_car_vc_cold <- median(perf_vc_36mts_cold$CAR36mnd)
head(wilcox_36mts_car_vc_cold)
head(median_36mts_car_vc_cold)

# TESTING DIFFERNCES IN MEDIAN ACROSS HOT/COLD AND SPONSORS - BHAR
#ALL
wilcox_all_hot_cold_bhar12mts <-
wilcox.test(perf_all_12mts_hot$BHAR12mnd,perf_all_12mts_cold$BHAR12mnd)
head(wilcox_all_hot_cold_bhar12mts)

wilcox_all_hot_cold_bhar24mts <-
wilcox.test(perf_all_24mts_hot$BHAR24mnd,perf_all_24mts_cold$BHAR24mnd)
head(wilcox_all_hot_cold_bhar24mts)

wilcox_all_hot_cold_bhar36mts <-
wilcox.test(perf_all_36mts_hot$BHAR36mnd,perf_all_36mts_cold$BHAR36mnd)
head(wilcox_all_hot_cold_bhar36mts)

#NPE
wilcox_npe_hot_cold_bhar12mts <-
wilcox.test(perf_npe_12mts_hot$BHAR12mnd,perf_npe_12mts_cold$BHAR12mnd)
head(wilcox_npe_hot_cold_bhar12mts)

wilcox_npe_hot_cold_bhar24mts <-
wilcox.test(perf_npe_24mts_hot$BHAR24mnd,perf_npe_24mts_cold$BHAR24mnd)
head(wilcox_npe_hot_cold_bhar24mts)

wilcox_npe_hot_cold_bhar36mts <-
wilcox.test(perf_npe_36mts_hot$BHAR36mnd,perf_npe_36mts_cold$BHAR36mnd)
head(wilcox_npe_hot_cold_bhar36mts)

#PE
wilcox_pe_hot_cold_bhar12mts <-
wilcox.test(perf_pe_12mts_hot$BHAR12mnd,perf_pe_12mts_cold$BHAR12mnd)
head(wilcox_pe_hot_cold_bhar12mts)

wilcox_pe_hot_cold_bhar24mts <-
wilcox.test(perf_pe_24mts_hot$BHAR24mnd,perf_pe_24mts_cold$BHAR24mnd)
head(wilcox_pe_hot_cold_bhar24mts)

```

```

wilcox_pe_hot_cold_bhar36mts <-
wilcox.test(perf_pe_36mts_hot$BHAR36mnd,perf_pe_36mts_cold$BHAR36mnd)
head(wilcox_pe_hot_cold_bhar36mts)

#VC
wilcox_vc_hot_cold_bhar12mts <-
wilcox.test(perf_vc_12mts_hot$BHAR12mnd,perf_vc_12mts_cold$BHAR12mnd)
head(wilcox_vc_hot_cold_bhar12mts)

wilcox_vc_hot_cold_bhar24mts <-
wilcox.test(perf_vc_24mts_hot$BHAR24mnd,perf_vc_24mts_cold$BHAR24mnd)
head(wilcox_vc_hot_cold_bhar24mts)

wilcox_vc_hot_cold_bhar36mts <-
wilcox.test(perf_vc_36mts_hot$BHAR36mnd,perf_vc_36mts_cold$BHAR36mnd)
head(wilcox_vc_hot_cold_bhar36mts)

#NPE VS PE IN HOT VS HOT
wilcox_npe_pe_hot_hot_bhar12mts <-
wilcox.test(perf_npe_12mts_hot$BHAR12mnd,perf_pe_12mts_hot$BHAR12mnd)
head(wilcox_npe_pe_hot_hot_bhar12mts)

wilcox_npe_pe_hot_hot_24mts <-
wilcox.test(perf_npe_24mts_hot$BHAR24mnd,perf_pe_24mts_hot$BHAR24mnd)
head(wilcox_npe_pe_hot_hot_24mts)

wilcox_npe_pe_hot_hot_36mts <-
wilcox.test(perf_npe_36mts_hot$BHAR36mnd,perf_pe_36mts_hot$BHAR36mnd)
head(wilcox_npe_pe_hot_hot_36mts)

# TESTING DIFFERNCES IN MEAN ACROSS HOT/COLD AND SPONSORS - CAR
#ALL
wilcox_all_hot_cold_car12mts <-
wilcox.test(perf_all_12mts_hot$CAR12mnd,perf_all_12mts_cold$CAR12mnd)
head(wilcox_all_hot_cold_car12mts)

wilcox_all_hot_cold_car24mts <-
wilcox.test(perf_all_24mts_hot$CAR24mnd,perf_all_24mts_cold$CAR24mnd)
head(wilcox_all_hot_cold_car24mts)

wilcox_all_hot_cold_car36mts <-
wilcox.test(perf_all_36mts_hot$CAR36mnd,perf_all_36mts_cold$CAR36mnd)
head(wilcox_all_hot_cold_car36mts)

#NPE
wilcox_npe_hot_cold_car12mts <-
wilcox.test(perf_npe_12mts_hot$CAR12mnd,perf_npe_12mts_cold$CAR12mnd)
head(wilcox_npe_hot_cold_car12mts)

wilcox_npe_hot_cold_car24mts <-
wilcox.test(perf_npe_24mts_hot$CAR24mnd,perf_npe_24mts_cold$CAR24mnd)
head(wilcox_npe_hot_cold_car24mts)

wilcox_npe_hot_cold_car36mts <-
wilcox.test(perf_npe_36mts_hot$CAR36mnd,perf_npe_36mts_cold$CAR36mnd)
head(wilcox_npe_hot_cold_car36mts)

```

```

#PE
wilcox_pe_hot_cold_car12mts <-
wilcox.test(perf_pe_12mts_hot$CAR12mnd,perf_pe_12mts_cold$CAR12mnd)
head(wilcox_pe_hot_cold_car12mts)

wilcox_pe_hot_cold_car24mts <-
wilcox.test(perf_pe_24mts_hot$CAR24mnd,perf_pe_24mts_cold$CAR24mnd)
head(wilcox_pe_hot_cold_car24mts)

wilcox_pe_hot_cold_car36mts <-
wilcox.test(perf_pe_36mts_hot$CAR36mnd,perf_pe_36mts_cold$CAR36mnd)
head(wilcox_pe_hot_cold_car36mts)

#VC
wilcox_vc_hot_cold_car12mts <-
wilcox.test(perf_vc_12mts_hot$CAR12mnd,perf_vc_12mts_cold$CAR12mnd)
head(wilcox_vc_hot_cold_car12mts)

wilcox_vc_hot_cold_car24mts <-
wilcox.test(perf_vc_24mts_hot$CAR24mnd,perf_vc_24mts_cold$CAR24mnd)
head(wilcox_vc_hot_cold_car24mts)

wilcox_vc_hot_cold_car36mts <-
wilcox.test(perf_vc_36mts_hot$CAR36mnd,perf_vc_36mts_cold$CAR36mnd)
head(wilcox_vc_hot_cold_car36mts)

#NPE VS PE IN HOT BS HOT
wilcox_npe_pe_hot_hot_car12mts <-
wilcox.test(perf_npe_12mts_hot$CAR12mnd,perf_pe_12mts_hot$CAR12mnd)
head(wilcox_npe_pe_hot_hot_car12mts)

wilcox_npe_pe_hot_hot_car24mts <-
wilcox.test(perf_npe_24mts_hot$CAR24mnd,perf_pe_24mts_hot$CAR24mnd)
head(wilcox_npe_pe_hot_hot_car24mts)

wilcox_npe_pe_hot_hot_car36mts <-
wilcox.test(perf_npe_36mts_hot$CAR36mnd,perf_pe_36mts_hot$CAR36mnd)
head(wilcox_npe_pe_hot_hot_car36mts)

# TESTING DIFFERENCES IN COUNTRY US/LN
#BHAR
wilcox_all_us_bhar12mts <- wilcox.test(perf_us_12mts$BHAR12mnd)
head(wilcox_all_us_bhar12mts)
median_12mts_bhar_us <- median(perf_us_12mts$BHAR12mnd)
head(median_12mts_bhar_us)

wilcox_all_us_bhar24mts <- wilcox.test(perf_us_24mts$BHAR24mnd)
head(wilcox_all_us_bhar24mts)
median_24mts_bhar_us <- median(perf_us_24mts$BHAR24mnd)
head(median_24mts_bhar_us)

wilcox_all_us_bhar36mts <- wilcox.test(perf_us_36mts$BHAR36mnd)
head(wilcox_all_us_bhar36mts)
median_36mts_bhar_us <- median(perf_us_36mts$BHAR36mnd)
head(median_36mts_bhar_us)

wilcox_all_ln_bhar12mts <- wilcox.test(perf_ln_12mts$BHAR12mnd)

```

```

head(wilcox_all_ln_bhar12mts)
median_12mts_bhar_ln <- median(perf_ln_12mts$BHAR12mnd)
head(median_12mts_bhar_ln)

wilcox_all_ln_bhar24mts <- wilcox.test(perf_ln_24mts$BHAR24mnd)
head(wilcox_all_ln_bhar24mts)
median_24mts_bhar_ln <- median(perf_ln_24mts$BHAR24mnd)
head(median_24mts_bhar_ln)

wilcox_all_ln_bhar36mts <- wilcox.test(perf_ln_36mts$BHAR36mnd)
head(wilcox_all_ln_bhar36mts)
median_36mts_bhar_ln <- median(perf_ln_36mts$BHAR36mnd)
head(median_36mts_bhar_ln)

#CAR
wilcox_all_us_car12mts <- wilcox.test(perf_us_12mts$CAR12mnd)
head(wilcox_all_us_car12mts)
median_12mts_car_us <- median(perf_us_12mts$CAR12mnd)
head(median_12mts_car_us)

wilcox_all_us_car24mts <- wilcox.test(perf_us_24mts$CAR24mnd)
head(wilcox_all_us_car24mts)
median_24mts_car_us <- median(perf_us_24mts$CAR24mnd)
head(median_24mts_car_us)

wilcox_all_us_car36mts <- wilcox.test(perf_us_36mts$CAR36mnd)
head(wilcox_all_us_car36mts)
median_36mts_car_us <- median(perf_us_36mts$CAR36mnd)
head(median_36mts_car_us)

wilcox_all_ln_car12mts <- wilcox.test(perf_ln_12mts$CAR12mnd)
head(wilcox_all_ln_car12mts)
median_12mts_car_ln <- median(perf_ln_12mts$CAR12mnd)
head(median_12mts_car_ln)

wilcox_all_ln_car24mts <- wilcox.test(perf_ln_24mts$CAR24mnd)
head(wilcox_all_ln_car24mts)
median_24mts_car_ln <- median(perf_ln_24mts$CAR24mnd)
head(median_24mts_car_ln)

wilcox_all_ln_car36mts <- wilcox.test(perf_ln_36mts$CAR36mnd)
head(wilcox_all_ln_car36mts)
median_36mts_car_ln <- median(perf_ln_36mts$CAR36mnd)
head(median_36mts_car_ln)

#TESTING DIFFERENCE IN LN US

#BHAR
wilcox_all_us_ln_bhar12mts <-
wilcox.test(perf_us_12mts$BHAR12mnd,perf_ln_12mts$BHAR12mnd)
head(wilcox_all_us_ln_bhar12mts)

wilcox_all_us_ln_bhar24mts <-
wilcox.test(perf_us_24mts$BHAR24mnd,perf_ln_24mts$BHAR24mnd)
head(wilcox_all_us_ln_bhar24mts)

```



```

wilcox_all_us_ln_bhar36mts <-
wilcox.test(perf_us_36mts$BHAR36mnd,perf_ln_36mts$BHAR36mnd)
head(wilcox_all_us_ln_bhar36mts)

#CAR
wilcox_all_us_ln_car12mts <-
wilcox.test(perf_us_12mts$CAR12mnd,perf_ln_12mts$CAR12mnd)
head(wilcox_all_us_ln_car12mts)

wilcox_all_us_ln_car24mts <-
wilcox.test(perf_us_24mts$CAR24mnd,perf_ln_24mts$CAR24mnd)
head(wilcox_all_us_ln_car24mts)

wilcox_all_us_ln_car36mts <-
wilcox.test(perf_us_36mts$CAR36mnd,perf_ln_36mts$CAR36mnd)
head(wilcox_all_us_ln_car36mts)

# TESTING DIFFERENCES IN MARKET CAP RANKING

#BHAR-HIGH
wilcox_all_mcap_high_bhar12mts <-
wilcox.test(perf_12mts_Mcap_high$BHAR12mnd)
head(wilcox_all_mcap_high_bhar12mts)
median_wilcox_all_mcap_high_bhar12mts <-
median(perf_12mts_Mcap_high$BHAR12mnd)
head(median_wilcox_all_mcap_high_bhar12mts)

wilcox_all_mcap_high_bhar24mts <-
wilcox.test(perf_24mts_Mcap_high$BHAR24mnd)
head(wilcox_all_mcap_high_bhar24mts)
median_wilcox_all_mcap_high_bhar24mts <-
median(perf_24mts_Mcap_high$BHAR24mnd)
head(median_wilcox_all_mcap_high_bhar24mts)

wilcox_all_mcap_high_bhar36mts <-
wilcox.test(perf_36mts_Mcap_high$BHAR36mnd)
head(wilcox_all_mcap_high_bhar36mts)
median_wilcox_all_mcap_high_bhar36mts <-
median(perf_36mts_Mcap_high$BHAR36mnd)
head(median_wilcox_all_mcap_high_bhar36mts)

#BHAR-MED
wilcox_all_mcap_med_bhar12mts <- wilcox.test(perf_12mts_Mcap_med$BHAR12mnd)
head(wilcox_all_mcap_med_bhar12mts)
median_wilcox_all_mcap_med_bhar12mts <-
median(perf_12mts_Mcap_med$BHAR12mnd)
head(median_wilcox_all_mcap_med_bhar12mts)

wilcox_all_mcap_med_bhar24mts <- wilcox.test(perf_24mts_Mcap_med$BHAR24mnd)
head(wilcox_all_mcap_med_bhar24mts)
median_wilcox_all_mcap_med_bhar24mts <-
median(perf_24mts_Mcap_med$BHAR24mnd)
head(median_wilcox_all_mcap_med_bhar24mts)

wilcox_all_mcap_med_bhar36mts <- wilcox.test(perf_36mts_Mcap_med$BHAR36mnd)
head(wilcox_all_mcap_med_bhar36mts)
median_wilcox_all_mcap_med_bhar36mts <-
median(perf_36mts_Mcap_med$BHAR36mnd)

```

```

head(median_wilcox_all_mcap_med_bhar36mts)

#BHAR-LOW
wilcox_all_mcap_low_bhar12mts <- wilcox.test(perf_12mts_Mcap_low$BHAR12mnd)
head(wilcox_all_mcap_low_bhar12mts)
median_wilcox_all_mcap_low_bhar12mts <-
median(perf_12mts_Mcap_low$BHAR12mnd)
head(median_wilcox_all_mcap_low_bhar12mts)

wilcox_all_mcap_low_bhar24mts <- wilcox.test(perf_24mts_Mcap_low$BHAR24mnd)
head(wilcox_all_mcap_low_bhar24mts)
median_wilcox_all_mcap_low_bhar24mts <-
median(perf_24mts_Mcap_low$BHAR24mnd)
head(median_wilcox_all_mcap_low_bhar24mts)

wilcox_all_mcap_low_bhar36mts <- wilcox.test(perf_36mts_Mcap_low$BHAR36mnd)
head(wilcox_all_mcap_low_bhar36mts)
median_wilcox_all_mcap_low_bhar36mts <-
median(perf_36mts_Mcap_low$BHAR36mnd)
head(median_wilcox_all_mcap_low_bhar36mts)

#CAR-HIGH
wilcox_all_mcap_high_car12mts <- wilcox.test(perf_12mts_Mcap_high$CAR12mnd)
head(wilcox_all_mcap_high_car12mts)
median_wilcox_all_mcap_high_car12mts <-
median(perf_12mts_Mcap_high$CAR12mnd)
head(median_wilcox_all_mcap_high_car12mts)

wilcox_all_mcap_high_car24mts <- wilcox.test(perf_24mts_Mcap_high$CAR24mnd)
head(wilcox_all_mcap_high_car24mts)
median_wilcox_all_mcap_high_car24mts <-
median(perf_24mts_Mcap_high$CAR24mnd)
head(median_wilcox_all_mcap_high_car24mts)

wilcox_all_mcap_high_car36mts <- wilcox.test(perf_36mts_Mcap_high$CAR36mnd)
head(wilcox_all_mcap_high_car36mts)
median_wilcox_all_mcap_high_car36mts <-
median(perf_36mts_Mcap_high$CAR36mnd)
head(median_wilcox_all_mcap_high_car36mts)

#car-MED
wilcox_all_mcap_med_car12mts <- wilcox.test(perf_12mts_Mcap_med$CAR12mnd)
head(wilcox_all_mcap_med_car12mts)
median_wilcox_all_mcap_med_car12mts <- median(perf_12mts_Mcap_med$CAR12mnd)
head(median_wilcox_all_mcap_med_car12mts)

wilcox_all_mcap_med_car24mts <- wilcox.test(perf_24mts_Mcap_med$CAR24mnd)
head(wilcox_all_mcap_med_car24mts)
median_wilcox_all_mcap_med_car24mts <- median(perf_24mts_Mcap_med$CAR24mnd)
head(median_wilcox_all_mcap_med_car24mts)

wilcox_all_mcap_med_car36mts <- wilcox.test(perf_36mts_Mcap_med$CAR36mnd)
head(wilcox_all_mcap_med_car36mts)
median_wilcox_all_mcap_med_car36mts <- median(perf_36mts_Mcap_med$CAR36mnd)
head(median_wilcox_all_mcap_med_car36mts)

```

```

#car-LOW
wilcox_all_mcap_low_car12mts <- wilcox.test(perf_12mts_Mcap_low$CAR12mnd)
head(wilcox_all_mcap_low_car12mts)
median_wilcox_all_mcap_low_car12mts <- median(perf_12mts_Mcap_low$CAR12mnd)
head(median_wilcox_all_mcap_low_car12mts)

wilcox_all_mcap_low_car24mts <- wilcox.test(perf_24mts_Mcap_low$CAR24mnd)
head(wilcox_all_mcap_low_car24mts)
median_wilcox_all_mcap_low_car24mts <- median(perf_24mts_Mcap_low$CAR24mnd)
head(median_wilcox_all_mcap_low_car24mts)

wilcox_all_mcap_low_car36mts <- wilcox.test(perf_36mts_Mcap_low$CAR36mnd)
head(wilcox_all_mcap_low_car36mts)
median_wilcox_all_mcap_low_car36mts <- median(perf_36mts_Mcap_low$CAR36mnd)
head(median_wilcox_all_mcap_low_car36mts)

# TESTING DIFFERENCE IN MEDIANS

#BHAR
#high-med
wilcox_all_mcap_high_med_bhar12mts <-
wilcox.test(perf_12mts_Mcap_high$BHAR12mnd,perf_12mts_Mcap_med$BHAR12mnd)
head(wilcox_all_mcap_high_med_bhar12mts)

wilcox_all_mcap_high_med_bhar24mts <-
wilcox.test(perf_24mts_Mcap_high$BHAR24mnd,perf_24mts_Mcap_med$BHAR24mnd)
head(wilcox_all_mcap_high_med_bhar24mts)

wilcox_all_mcap_high_med_bhar36mts <-
wilcox.test(perf_36mts_Mcap_high$BHAR36mnd,perf_36mts_Mcap_med$BHAR36mnd)
head(wilcox_all_mcap_high_med_bhar36mts)

#BHAR
#high-low
wilcox_all_mcap_high_low_bhar12mts <-
wilcox.test(perf_12mts_Mcap_high$BHAR12mnd,perf_12mts_Mcap_low$BHAR12mnd)
head(wilcox_all_mcap_high_low_bhar12mts)

wilcox_all_mcap_high_low_bhar24mts <-
wilcox.test(perf_24mts_Mcap_high$BHAR24mnd,perf_24mts_Mcap_low$BHAR24mnd)
head(wilcox_all_mcap_high_low_bhar24mts)

wilcox_all_mcap_high_low_bhar36mts <-
wilcox.test(perf_36mts_Mcap_high$BHAR36mnd,perf_36mts_Mcap_low$BHAR36mnd)
head(wilcox_all_mcap_high_low_bhar36mts)

#BHAR
#med-low
wilcox_all_mcap_med_low_bhar12mts <-
wilcox.test(perf_12mts_Mcap_med$BHAR12mnd,perf_12mts_Mcap_low$BHAR12mnd)
head(wilcox_all_mcap_med_low_bhar12mts)

wilcox_all_mcap_med_low_bhar24mts <-
wilcox.test(perf_24mts_Mcap_med$BHAR24mnd,perf_24mts_Mcap_low$BHAR24mnd)
head(wilcox_all_mcap_med_low_bhar24mts)

wilcox_all_mcap_med_low_bhar36mts <-
wilcox.test(perf_36mts_Mcap_med$BHAR36mnd,perf_36mts_Mcap_low$BHAR36mnd)

```

```

head(wilcox_all_mcap_med_low_bhar36mts)

#CAR
#high-med
wilcox_all_mcap_high_med_car12mts <-
wilcox.test(perf_12mts_Mcap_high$CAR12mnd,perf_12mts_Mcap_med$CAR12mnd)
head(wilcox_all_mcap_high_med_car12mts)

wilcox_all_mcap_high_med_car24mts <-
wilcox.test(perf_24mts_Mcap_high$CAR24mnd,perf_24mts_Mcap_med$CAR24mnd)
head(wilcox_all_mcap_high_med_car24mts)

wilcox_all_mcap_high_med_car36mts <-
wilcox.test(perf_36mts_Mcap_high$CAR36mnd,perf_36mts_Mcap_med$CAR36mnd)
head(wilcox_all_mcap_high_med_car36mts)

#car
#high-low
wilcox_all_mcap_high_low_car12mts <-
wilcox.test(perf_12mts_Mcap_high$CAR12mnd,perf_12mts_Mcap_low$CAR12mnd)
head(wilcox_all_mcap_high_low_car12mts)

wilcox_all_mcap_high_low_car24mts <-
wilcox.test(perf_24mts_Mcap_high$CAR24mnd,perf_24mts_Mcap_low$CAR24mnd)
head(wilcox_all_mcap_high_low_car24mts)

wilcox_all_mcap_high_low_car36mts <-
wilcox.test(perf_36mts_Mcap_high$CAR36mnd,perf_36mts_Mcap_low$CAR36mnd)
head(wilcox_all_mcap_high_low_car36mts)

#car
#med-low
wilcox_all_mcap_med_low_car12mts <-
wilcox.test(perf_12mts_Mcap_med$CAR12mnd,perf_12mts_Mcap_low$CAR12mnd)
head(wilcox_all_mcap_med_low_car12mts)

wilcox_all_mcap_med_low_car24mts <-
wilcox.test(perf_24mts_Mcap_med$CAR24mnd,perf_24mts_Mcap_low$CAR24mnd)
head(wilcox_all_mcap_med_low_car24mts)

wilcox_all_mcap_med_low_car36mts <-
wilcox.test(perf_36mts_Mcap_med$CAR36mnd,perf_36mts_Mcap_low$CAR36mnd)
head(wilcox_all_mcap_med_low_car36mts)

# TESTING DIFFERENCES IN EQUITY CAP RANKING

#BHAR-HIGH
wilcox_all_eq_high_bhar12mts <- wilcox.test(perf_12mts_Eq_high$BHAR12mnd)
head(wilcox_all_eq_high_bhar12mts)
median_wilcox_all_eq_high_bhar12mts <- median(perf_12mts_Eq_high$BHAR12mnd)
head(median_wilcox_all_eq_high_bhar12mts)

wilcox_all_eq_high_bhar24mts <- wilcox.test(perf_24mts_Eq_high$BHAR24mnd)
head(wilcox_all_eq_high_bhar24mts)
median_wilcox_all_eq_high_bhar24mts <- median(perf_24mts_Eq_high$BHAR24mnd)

```

```

head(median_wilcox_all_eq_high_bhar24mts)

wilcox_all_eq_high_bhar36mts <- wilcox.test(perf_36mts_Eq_high$BHAR36mnd)
head(wilcox_all_eq_high_bhar36mts)
median_wilcox_all_eq_high_bhar36mts <- median(perf_36mts_Eq_high$BHAR36mnd)
head(median_wilcox_all_eq_high_bhar36mts)

#BHAR-MED
wilcox_all_eq_med_bhar12mts <- wilcox.test(perf_12mts_Eq_med$BHAR12mnd)
head(wilcox_all_eq_med_bhar12mts)
median_wilcox_all_eq_med_bhar12mts <- median(perf_12mts_Eq_med$BHAR12mnd)
head(median_wilcox_all_eq_med_bhar12mts)

wilcox_all_eq_med_bhar24mts <- wilcox.test(perf_24mts_Eq_med$BHAR24mnd)
head(wilcox_all_eq_med_bhar24mts)
median_wilcox_all_eq_med_bhar24mts <- median(perf_24mts_Eq_med$BHAR24mnd)
head(median_wilcox_all_eq_med_bhar24mts)

wilcox_all_eq_med_bhar36mts <- wilcox.test(perf_36mts_Eq_med$BHAR36mnd)
head(wilcox_all_eq_med_bhar36mts)
median_wilcox_all_eq_med_bhar36mts <- median(perf_36mts_Eq_med$BHAR36mnd)
head(median_wilcox_all_eq_med_bhar36mts)

#BHAR-LOW
wilcox_all_eq_low_bhar12mts <- wilcox.test(perf_12mts_Eq_low$BHAR12mnd)
head(wilcox_all_eq_low_bhar12mts)
median_wilcox_all_eq_low_bhar12mts <- median(perf_12mts_Eq_low$BHAR12mnd)
head(median_wilcox_all_eq_low_bhar12mts)

wilcox_all_eq_low_bhar24mts <- wilcox.test(perf_24mts_Eq_low$BHAR24mnd)
head(wilcox_all_eq_low_bhar24mts)
median_wilcox_all_eq_low_bhar24mts <- median(perf_24mts_Eq_low$BHAR24mnd)
head(median_wilcox_all_eq_low_bhar24mts)

wilcox_all_eq_low_bhar36mts <- wilcox.test(perf_36mts_Eq_low$BHAR36mnd)
head(wilcox_all_eq_low_bhar36mts)
median_wilcox_all_eq_low_bhar36mts <- median(perf_36mts_Eq_low$BHAR36mnd)
head(median_wilcox_all_eq_low_bhar36mts)

#CAR-HIGH
wilcox_all_eq_high_car12mts <- wilcox.test(perf_12mts_Eq_high$CAR12mnd)
head(wilcox_all_eq_high_car12mts)
median_wilcox_all_eq_high_car12mts <- median(perf_12mts_Eq_high$CAR12mnd)
head(median_wilcox_all_eq_high_car12mts)

wilcox_all_eq_high_car24mts <- wilcox.test(perf_24mts_Eq_high$CAR24mnd)
head(wilcox_all_eq_high_car24mts)
median_wilcox_all_eq_high_car24mts <- median(perf_24mts_Eq_high$CAR24mnd)
head(median_wilcox_all_eq_high_car24mts)

wilcox_all_eq_high_car36mts <- wilcox.test(perf_36mts_Eq_high$CAR36mnd)
head(wilcox_all_eq_high_car36mts)
median_wilcox_all_eq_high_car36mts <- median(perf_36mts_Eq_high$CAR36mnd)
head(median_wilcox_all_eq_high_car36mts)

#car-MED
wilcox_all_eq_med_car12mts <- wilcox.test(perf_12mts_Eq_med$CAR12mnd)

```

```
head(wilcox_all_eq_med_car12mts)
median_wilcox_all_eq_med_car12mts <- median(perf_12mts_Eq_med$CAR12mnd)
head(median_wilcox_all_eq_med_car12mts)
```

```
wilcox_all_eq_med_car24mts <- wilcox.test(perf_24mts_Eq_med$CAR24mnd)
head(wilcox_all_eq_med_car24mts)
median_wilcox_all_eq_med_car24mts <- median(perf_24mts_Eq_med$CAR24mnd)
head(median_wilcox_all_eq_med_car24mts)
```

```
wilcox_all_eq_med_car36mts <- wilcox.test(perf_36mts_Eq_med$CAR36mnd)
head(wilcox_all_eq_med_car36mts)
median_wilcox_all_eq_med_car36mts <- median(perf_36mts_Eq_med$CAR36mnd)
head(median_wilcox_all_eq_med_car36mts)
```

```
#car-LOW
```

```
wilcox_all_eq_low_car12mts <- wilcox.test(perf_12mts_Eq_low$CAR12mnd)
head(wilcox_all_eq_low_car12mts)
median_wilcox_all_eq_low_car12mts <- median(perf_12mts_Eq_low$CAR12mnd)
head(median_wilcox_all_eq_low_car12mts)
```

```
wilcox_all_eq_low_car24mts <- wilcox.test(perf_24mts_Eq_low$CAR24mnd)
head(wilcox_all_eq_low_car24mts)
median_wilcox_all_eq_low_car24mts <- median(perf_24mts_Eq_low$CAR24mnd)
head(median_wilcox_all_eq_low_car24mts)
```

```
wilcox_all_eq_low_car36mts <- wilcox.test(perf_36mts_Eq_low$CAR36mnd)
head(wilcox_all_eq_low_car36mts)
median_wilcox_all_eq_low_car36mts <- median(perf_36mts_Eq_low$CAR36mnd)
head(median_wilcox_all_eq_low_car36mts)
```

```
# TESTING DIFFERENCE IN MEDIANS
```

```
#BHAR
```

```
#high-med
```

```
wilcox_all_eq_high_med_bhar12mts <-
wilcox.test(perf_12mts_Eq_high$BHAR12mnd,perf_12mts_Eq_med$BHAR12mnd)
head(wilcox_all_eq_high_med_bhar12mts)
```

```
wilcox_all_eq_high_med_bhar24mts <-
wilcox.test(perf_24mts_Eq_high$BHAR24mnd,perf_24mts_Eq_med$BHAR24mnd)
head(wilcox_all_eq_high_med_bhar24mts)
```

```
wilcox_all_eq_high_med_bhar36mts <-
wilcox.test(perf_36mts_Eq_high$BHAR36mnd,perf_36mts_Eq_med$BHAR36mnd)
head(wilcox_all_eq_high_med_bhar36mts)
```

```
#BHAR
```

```
#high-low
```

```
wilcox_all_eq_high_low_bhar12mts <-
wilcox.test(perf_12mts_Eq_high$BHAR12mnd,perf_12mts_Eq_low$BHAR12mnd)
head(wilcox_all_eq_high_low_bhar12mts)
```

```
wilcox_all_eq_high_low_bhar24mts <-
wilcox.test(perf_24mts_Eq_high$BHAR24mnd,perf_24mts_Eq_low$BHAR24mnd)
head(wilcox_all_eq_high_low_bhar24mts)
```

```
wilcox_all_eq_high_low_bhar36mts <-  
wilcox.test(perf_36mts_Eq_high$BHAR36mnd,perf_36mts_Eq_low$BHAR36mnd)  
head(wilcox_all_eq_high_low_bhar36mts)
```

```
#BHAR  
#med-low  
wilcox_all_eq_med_low_bhar12mts <-  
wilcox.test(perf_12mts_Eq_med$BHAR12mnd,perf_12mts_Eq_low$BHAR12mnd)  
head(wilcox_all_eq_med_low_bhar12mts)
```

```
wilcox_all_eq_med_low_bhar24mts <-  
wilcox.test(perf_24mts_Eq_med$BHAR24mnd,perf_24mts_Eq_low$BHAR24mnd)  
head(wilcox_all_eq_med_low_bhar24mts)
```

```
wilcox_all_eq_med_low_bhar36mts <-  
wilcox.test(perf_36mts_Eq_med$BHAR36mnd,perf_36mts_Eq_low$BHAR36mnd)  
head(wilcox_all_eq_med_low_bhar36mts)
```

```
#CAR  
#high-med  
wilcox_all_eq_high_med_car12mts <-  
wilcox.test(perf_12mts_Eq_high$CAR12mnd,perf_12mts_Eq_med$CAR12mnd)  
head(wilcox_all_eq_high_med_car12mts)
```

```
wilcox_all_eq_high_med_car24mts <-  
wilcox.test(perf_24mts_Eq_high$CAR24mnd,perf_24mts_Eq_med$CAR24mnd)  
head(wilcox_all_eq_high_med_car24mts)
```

```
wilcox_all_eq_high_med_car36mts <-  
wilcox.test(perf_36mts_Eq_high$CAR36mnd,perf_36mts_Eq_med$CAR36mnd)  
head(wilcox_all_eq_high_med_car36mts)
```

```
#car  
#high-low  
wilcox_all_eq_high_low_car12mts <-  
wilcox.test(perf_12mts_Eq_high$CAR12mnd,perf_12mts_Eq_low$CAR12mnd)  
head(wilcox_all_eq_high_low_car12mts)
```

```
wilcox_all_eq_high_low_car24mts <-  
wilcox.test(perf_24mts_Eq_high$CAR24mnd,perf_24mts_Eq_low$CAR24mnd)  
head(wilcox_all_eq_high_low_car24mts)
```

```
wilcox_all_eq_high_low_car36mts <-  
wilcox.test(perf_36mts_Eq_high$CAR36mnd,perf_36mts_Eq_low$CAR36mnd)  
head(wilcox_all_eq_high_low_car36mts)
```

```
#car  
#med-low  
wilcox_all_eq_med_low_car12mts <-  
wilcox.test(perf_12mts_Eq_med$CAR12mnd,perf_12mts_Eq_low$CAR12mnd)  
head(wilcox_all_eq_med_low_car12mts)
```

```
wilcox_all_eq_med_low_car24mts <-  
wilcox.test(perf_24mts_Eq_med$CAR24mnd,perf_24mts_Eq_low$CAR24mnd)  
head(wilcox_all_eq_med_low_car24mts)
```



```

vc_24mts_Utilityies <- subset(perf_24mts_Utilityies, Definition == "VC",
                             select=c(BHAR24mnd, CAR24mnd))
vc_36mts_Utilityies <- subset(perf_36mts_Utilityies, Definition == "VC",
                             select=c(BHAR36mnd, CAR36mnd))

## BHAR12,24,36(ALL -> NPE -> PE -> VC) then CAR12,24,36(ALL -> NPE -> PE -
> VC)
willcox_perf_bhar12mts_basicmaterials <-
wilcox.test(perf_12mts_basicmaterials$BHAR12mnd)
median_perf_bhar12mts_basicmaterials <-
median(perf_12mts_basicmaterials$BHAR12mnd)
head(willcox_perf_bhar12mts_basicmaterials)
head(median_perf_bhar12mts_basicmaterials)
willcox_perf_bhar24mts_basicmaterials <-
wilcox.test(perf_24mts_basicmaterials$BHAR24mnd)
median_perf_bhar24mts_basicmaterials <-
median(perf_24mts_basicmaterials$BHAR24mnd)
head(willcox_perf_bhar24mts_basicmaterials)
head(median_perf_bhar24mts_basicmaterials)
willcox_perf_bhar36mts_basicmaterials <-
wilcox.test(perf_36mts_basicmaterials$BHAR36mnd)
median_perf_bhar36mts_basicmaterials <-
median(perf_36mts_basicmaterials$BHAR36mnd)
head(willcox_perf_bhar36mts_basicmaterials)
head(median_perf_bhar36mts_basicmaterials)

willcox_perf_bhar12mts_Communications <-
wilcox.test(perf_12mts_Communications$BHAR12mnd)
median_perf_bhar12mts_Communications <-
median(perf_12mts_Communications$BHAR12mnd)
head(willcox_perf_bhar12mts_Communications)
head(median_perf_bhar12mts_Communications)
willcox_perf_bhar24mts_Communications <-
wilcox.test(perf_24mts_Communications$BHAR24mnd)
median_perf_bhar24mts_Communications <-
median(perf_24mts_Communications$BHAR24mnd)
head(willcox_perf_bhar24mts_Communications)
head(median_perf_bhar24mts_Communications)
willcox_perf_bhar36mts_Communications <-
wilcox.test(perf_36mts_Communications$BHAR36mnd)
median_perf_bhar36mts_Communications <-
median(perf_36mts_Communications$BHAR36mnd)
head(willcox_perf_bhar36mts_Communications)
head(median_perf_bhar36mts_Communications)

willcox_perf_bhar12mts_ConsumerCyclical <-
wilcox.test(perf_12mts_ConsumerCyclical$BHAR12mnd)
median_perf_bhar12mts_ConsumerCyclical <-
median(perf_12mts_ConsumerCyclical$BHAR12mnd)
head(willcox_perf_bhar12mts_ConsumerCyclical)
head(median_perf_bhar12mts_ConsumerCyclical)
willcox_perf_bhar24mts_ConsumerCyclical <-
wilcox.test(perf_24mts_ConsumerCyclical$BHAR24mnd)
median_perf_bhar24mts_ConsumerCyclical <-
median(perf_24mts_ConsumerCyclical$BHAR24mnd)
head(willcox_perf_bhar24mts_ConsumerCyclical)
head(median_perf_bhar24mts_ConsumerCyclical)

```

```

willcox_perf_bhar36mts_ConsumerCyclical <-
wilcox.test(perf_36mts_ConsumerCyclical$BHAR36mnd)
median_perf_bhar36mts_ConsumerCyclical <-
median(perf_36mts_ConsumerCyclical$BHAR36mnd)
head(willcox_perf_bhar36mts_ConsumerCyclical)
head(median_perf_bhar36mts_ConsumerCyclical)

willcox_perf_bhar12mts_ConsumerNonCyclical <-
wilcox.test(perf_12mts_ConsumerNonCyclical$BHAR12mnd)
median_perf_bhar12mts_ConsumerNonCyclical <-
median(perf_12mts_ConsumerNonCyclical$BHAR12mnd)
head(willcox_perf_bhar12mts_ConsumerNonCyclical)
head(median_perf_bhar12mts_ConsumerNonCyclical)
willcox_perf_bhar24mts_ConsumerNonCyclical <-
wilcox.test(perf_24mts_ConsumerNonCyclical$BHAR24mnd)
median_perf_bhar24mts_ConsumerNonCyclical <-
median(perf_24mts_ConsumerNonCyclical$BHAR24mnd)
head(willcox_perf_bhar24mts_ConsumerNonCyclical)
head(median_perf_bhar24mts_ConsumerNonCyclical)
willcox_perf_bhar36mts_ConsumerNonCyclical <-
wilcox.test(perf_36mts_ConsumerNonCyclical$BHAR36mnd)
median_perf_bhar36mts_ConsumerNonCyclical <-
median(perf_36mts_ConsumerNonCyclical$BHAR36mnd)
head(willcox_perf_bhar36mts_ConsumerNonCyclical)
head(median_perf_bhar36mts_ConsumerNonCyclical)

willcox_perf_bhar12mts_Financial <-
wilcox.test(perf_12mts_Financial$BHAR12mnd)
median_perf_bhar12mts_Financial <- median(perf_12mts_Financial$BHAR12mnd)
head(willcox_perf_bhar12mts_Financial)
head(median_perf_bhar12mts_Financial)
willcox_perf_bhar24mts_Financial <-
wilcox.test(perf_24mts_Financial$BHAR24mnd)
median_perf_bhar24mts_Financial <- median(perf_24mts_Financial$BHAR24mnd)
head(willcox_perf_bhar24mts_Financial)
head(median_perf_bhar24mts_Financial)
willcox_perf_bhar36mts_Financial <-
wilcox.test(perf_36mts_Financial$BHAR36mnd)
median_perf_bhar36mts_Financial <- median(perf_36mts_Financial$BHAR36mnd)
head(willcox_perf_bhar36mts_Financial)
head(median_perf_bhar36mts_Financial)

willcox_perf_bhar12mts_Technology <-
wilcox.test(perf_12mts_Technology$BHAR12mnd)
median_perf_bhar12mts_Technology <- median(perf_12mts_Technology$BHAR12mnd)
head(willcox_perf_bhar12mts_Technology)
head(median_perf_bhar12mts_Technology)
willcox_perf_bhar24mts_Technology <-
wilcox.test(perf_24mts_Technology$BHAR24mnd)
median_perf_bhar24mts_Technology <- median(perf_24mts_Technology$BHAR24mnd)
head(willcox_perf_bhar24mts_Technology)
head(median_perf_bhar24mts_Technology)
willcox_perf_bhar36mts_Technology <-
wilcox.test(perf_36mts_Technology$BHAR36mnd)
median_perf_bhar36mts_Technology <- median(perf_36mts_Technology$BHAR36mnd)
head(willcox_perf_bhar36mts_Technology)
head(median_perf_bhar36mts_Technology)

```

```

willcox_perf_bhar12mts_Energy <- wilcox.test(perf_12mts_Energy$BHAR12mnd)
median_perf_bhar12mts_Energy <- median(perf_12mts_Energy$BHAR12mnd)
head(willcox_perf_bhar12mts_Energy)
head(median_perf_bhar12mts_Energy)
willcox_perf_bhar24mts_Energy <- wilcox.test(perf_24mts_Energy$BHAR24mnd)
median_perf_bhar24mts_Energy <- median(perf_24mts_Energy$BHAR24mnd)
head(willcox_perf_bhar24mts_Energy)
head(median_perf_bhar24mts_Energy)
willcox_perf_bhar36mts_Energy <- wilcox.test(perf_36mts_Energy$BHAR36mnd)
median_perf_bhar36mts_Energy <- median(perf_36mts_Energy$BHAR36mnd)
head(willcox_perf_bhar36mts_Energy)
head(median_perf_bhar36mts_Energy)

willcox_perf_bhar12mts_Industrial <-
wilcox.test(perf_12mts_Industrial$BHAR12mnd)
median_perf_bhar12mts_Industrial <- median(perf_12mts_Industrial$BHAR12mnd)
head(willcox_perf_bhar12mts_Industrial)
head(median_perf_bhar12mts_Industrial)
willcox_perf_bhar24mts_Industrial <-
wilcox.test(perf_24mts_Industrial$BHAR24mnd)
median_perf_bhar24mts_Industrial <- median(perf_24mts_Industrial$BHAR24mnd)
head(willcox_perf_bhar24mts_Industrial)
head(median_perf_bhar24mts_Industrial)
willcox_perf_bhar36mts_Industrial <-
wilcox.test(perf_36mts_Industrial$BHAR36mnd)
median_perf_bhar36mts_Industrial <- median(perf_36mts_Industrial$BHAR36mnd)
head(willcox_perf_bhar36mts_Industrial)
head(median_perf_bhar36mts_Industrial)

willcox_perf_bhar12mts_Utillities <-
wilcox.test(perf_12mts_Utillities$BHAR12mnd)
median_perf_bhar12mts_Utillities <- median(perf_12mts_Utillities$BHAR12mnd)
head(willcox_perf_bhar12mts_Utillities)
head(median_perf_bhar12mts_Utillities)
willcox_perf_bhar24mts_Utillities <-
wilcox.test(perf_24mts_Utillities$BHAR24mnd)
median_perf_bhar24mts_Utillities <- median(perf_24mts_Utillities$BHAR24mnd)
head(willcox_perf_bhar24mts_Utillities)
head(median_perf_bhar24mts_Utillities)
willcox_perf_bhar36mts_Utillities <-
wilcox.test(perf_36mts_Utillities$BHAR36mnd)
median_perf_bhar36mts_Utillities <- median(perf_36mts_Utillities$BHAR36mnd)
head(willcox_perf_bhar36mts_Utillities)
head(median_perf_bhar36mts_Utillities)

willcox_perf_car12mts_basicmaterials <-
wilcox.test(perf_12mts_basicmaterials$CAR12mnd)
median_perf_car12mts_basicmaterials <-
median(perf_12mts_basicmaterials$CAR12mnd)
head(willcox_perf_car12mts_basicmaterials)
head(median_perf_car12mts_basicmaterials)
willcox_perf_car24mts_basicmaterials <-
wilcox.test(perf_24mts_basicmaterials$CAR24mnd)
median_perf_car24mts_basicmaterials <-
median(perf_24mts_basicmaterials$CAR24mnd)
head(willcox_perf_car24mts_basicmaterials)
head(median_perf_car24mts_basicmaterials)

```

```
willcox_perf_car36mts_basicmaterials <-
wilcox.test(perf_36mts_basicmaterials$CAR36mnd)
median_perf_car36mts_basicmaterials <-
median(perf_36mts_basicmaterials$CAR36mnd)
head(willcox_perf_car36mts_basicmaterials)
head(median_perf_car36mts_basicmaterials)

willcox_perf_car12mts_Communications <-
wilcox.test(perf_12mts_Communications$CAR12mnd)
median_perf_car12mts_Communications <-
median(perf_12mts_Communications$CAR12mnd)
head(willcox_perf_car12mts_Communications)
head(median_perf_car12mts_Communications)
willcox_perf_car24mts_Communications <-
wilcox.test(perf_24mts_Communications$CAR24mnd)
median_perf_car24mts_Communications <-
median(perf_24mts_Communications$CAR24mnd)
head(willcox_perf_car24mts_Communications)
head(median_perf_car24mts_Communications)
willcox_perf_car36mts_Communications <-
wilcox.test(perf_36mts_Communications$CAR36mnd)
median_perf_car36mts_Communications <-
median(perf_36mts_Communications$CAR36mnd)
head(willcox_perf_car36mts_Communications)
head(median_perf_car36mts_Communications)

willcox_perf_car12mts_ConsumerCyclical <-
wilcox.test(perf_12mts_ConsumerCyclical$CAR12mnd)
median_perf_car12mts_ConsumerCyclical <-
median(perf_12mts_ConsumerCyclical$CAR12mnd)
head(willcox_perf_car12mts_ConsumerCyclical)
head(median_perf_car12mts_ConsumerCyclical)
willcox_perf_car24mts_ConsumerCyclical <-
wilcox.test(perf_24mts_ConsumerCyclical$CAR24mnd)
median_perf_car24mts_ConsumerCyclical <-
median(perf_24mts_ConsumerCyclical$CAR24mnd)
head(willcox_perf_car24mts_ConsumerCyclical)
head(median_perf_car24mts_ConsumerCyclical)
willcox_perf_car36mts_ConsumerCyclical <-
wilcox.test(perf_36mts_ConsumerCyclical$CAR36mnd)
median_perf_car36mts_ConsumerCyclical <-
median(perf_36mts_ConsumerCyclical$CAR36mnd)
head(willcox_perf_car36mts_ConsumerCyclical)
head(median_perf_car36mts_ConsumerCyclical)

willcox_perf_car12mts_ConsumerNonCyclical <-
wilcox.test(perf_12mts_ConsumerNonCyclical$CAR12mnd)
median_perf_car12mts_ConsumerNonCyclical <-
median(perf_12mts_ConsumerNonCyclical$CAR12mnd)
head(willcox_perf_car12mts_ConsumerNonCyclical)
head(median_perf_car12mts_ConsumerNonCyclical)
willcox_perf_car24mts_ConsumerNonCyclical <-
wilcox.test(perf_24mts_ConsumerNonCyclical$CAR24mnd)
median_perf_car24mts_ConsumerNonCyclical <-
median(perf_24mts_ConsumerNonCyclical$CAR24mnd)
head(willcox_perf_car24mts_ConsumerNonCyclical)
head(median_perf_car24mts_ConsumerNonCyclical)
```

```

willcox_perf_car36mts_ConsumerNonCyclical <-
wilcox.test(perf_36mts_ConsumerNonCyclical$CAR36mnd)
median_perf_car36mts_ConsumerNonCyclical <-
median(perf_36mts_ConsumerNonCyclical$CAR36mnd)
head(willcox_perf_car36mts_ConsumerNonCyclical)
head(median_perf_car36mts_ConsumerNonCyclical)

willcox_perf_car12mts_Financial <-
wilcox.test(perf_12mts_Financial$CAR12mnd)
median_perf_car12mts_Financial <- median(perf_12mts_Financial$CAR12mnd)
head(willcox_perf_car12mts_Financial)
head(median_perf_car12mts_Financial)
willcox_perf_car24mts_Financial <-
wilcox.test(perf_24mts_Financial$CAR24mnd)
median_perf_car24mts_Financial <- median(perf_24mts_Financial$CAR24mnd)
head(willcox_perf_car24mts_Financial)
head(median_perf_car24mts_Financial)
willcox_perf_car36mts_Financial <-
wilcox.test(perf_36mts_Financial$CAR36mnd)
median_perf_car36mts_Financial <- median(perf_36mts_Financial$CAR36mnd)
head(willcox_perf_car36mts_Financial)
head(median_perf_car36mts_Financial)

willcox_perf_car12mts_Technology <-
wilcox.test(perf_12mts_Technology$CAR12mnd)
median_perf_car12mts_Technology <- median(perf_12mts_Technology$CAR12mnd)
head(willcox_perf_car12mts_Technology)
head(median_perf_car12mts_Technology)
willcox_perf_car24mts_Technology <-
wilcox.test(perf_24mts_Technology$CAR24mnd)
median_perf_car24mts_Technology <- median(perf_24mts_Technology$CAR24mnd)
head(willcox_perf_car24mts_Technology)
head(median_perf_car24mts_Technology)
willcox_perf_car36mts_Technology <-
wilcox.test(perf_36mts_Technology$CAR36mnd)
median_perf_car36mts_Technology <- median(perf_36mts_Technology$CAR36mnd)
head(willcox_perf_car36mts_Technology)
head(median_perf_car36mts_Technology)

willcox_perf_car12mts_Energy <- wilcox.test(perf_12mts_Energy$CAR12mnd)
median_perf_car12mts_Energy <- median(perf_12mts_Energy$CAR12mnd)
head(willcox_perf_car12mts_Energy)
head(median_perf_car12mts_Energy)
willcox_perf_car24mts_Energy <- wilcox.test(perf_24mts_Energy$CAR24mnd)
median_perf_car24mts_Energy <- median(perf_24mts_Energy$CAR24mnd)
head(willcox_perf_car24mts_Energy)
head(median_perf_car24mts_Energy)
willcox_perf_car36mts_Energy <- wilcox.test(perf_36mts_Energy$CAR36mnd)
median_perf_car36mts_Energy <- median(perf_36mts_Energy$CAR36mnd)
head(willcox_perf_car36mts_Energy)
head(median_perf_car36mts_Energy)

willcox_perf_car12mts_Industrial <-
wilcox.test(perf_12mts_Industrial$CAR12mnd)
median_perf_car12mts_Industrial <- median(perf_12mts_Industrial$CAR12mnd)
head(willcox_perf_car12mts_Industrial)
head(median_perf_car12mts_Industrial)

```



```
willcox_perf_car24mts_Industrial <-  
wilcox.test(perf_24mts_Industrial$CAR24mnd)  
median_perf_car24mts_Industrial <- median(perf_24mts_Industrial$CAR24mnd)  
head(willcox_perf_car24mts_Industrial)  
head(median_perf_car24mts_Industrial)  
willcox_perf_car36mts_Industrial <-  
wilcox.test(perf_36mts_Industrial$CAR36mnd)  
median_perf_car36mts_Industrial <- median(perf_36mts_Industrial$CAR36mnd)  
head(willcox_perf_car36mts_Industrial)  
head(median_perf_car36mts_Industrial)
```

```
willcox_perf_car12mts_Utillities <-  
wilcox.test(perf_12mts_Utillities$CAR12mnd)  
median_perf_car12mts_Utillities <- median(perf_12mts_Utillities$CAR12mnd)  
head(willcox_perf_car12mts_Utillities)  
head(median_perf_car12mts_Utillities)  
willcox_perf_car24mts_Utillities <-  
wilcox.test(perf_24mts_Utillities$CAR24mnd)  
median_perf_car24mts_Utillities <- median(perf_24mts_Utillities$CAR24mnd)  
head(willcox_perf_car24mts_Utillities)  
head(median_perf_car24mts_Utillities)  
willcox_perf_car36mts_Utillities <-  
wilcox.test(perf_36mts_Utillities$CAR36mnd)  
median_perf_car36mts_Utillities <- median(perf_36mts_Utillities$CAR36mnd)  
head(willcox_perf_car36mts_Utillities)  
head(median_perf_car36mts_Utillities)
```

#NPE

```
willcox_npe_bhar12mts_basicmaterials <-  
wilcox.test(npe_12mts_basicmaterials$BHAR12mnd)  
median_npe_bhar12mts_basicmaterials <-  
median(npe_12mts_basicmaterials$BHAR12mnd)  
head(willcox_npe_bhar12mts_basicmaterials)  
head(median_npe_bhar12mts_basicmaterials)  
willcox_npe_bhar24mts_basicmaterials <-  
wilcox.test(npe_24mts_basicmaterials$BHAR24mnd)  
median_npe_bhar24mts_basicmaterials <-  
median(npe_24mts_basicmaterials$BHAR24mnd)  
head(willcox_npe_bhar24mts_basicmaterials)  
head(median_npe_bhar24mts_basicmaterials)  
willcox_npe_bhar36mts_basicmaterials <-  
wilcox.test(npe_36mts_basicmaterials$BHAR36mnd)  
median_npe_bhar36mts_basicmaterials <-  
median(npe_36mts_basicmaterials$BHAR36mnd)  
head(willcox_npe_bhar36mts_basicmaterials)  
head(median_npe_bhar36mts_basicmaterials)
```

```
willcox_npe_bhar12mts_Communications <-  
wilcox.test(npe_12mts_Communications$BHAR12mnd)  
median_npe_bhar12mts_Communications <-  
median(npe_12mts_Communications$BHAR12mnd)  
head(willcox_npe_bhar12mts_Communications)  
head(median_npe_bhar12mts_Communications)
```

```

willcox_npe_bhar24mts_Communications <-
wilcox.test(npe_24mts_Communications$BHAR24mnd)
median_npe_bhar24mts_Communications <-
median(npe_24mts_Communications$BHAR24mnd)
head(willcox_npe_bhar24mts_Communications)
head(median_npe_bhar24mts_Communications)
willcox_npe_bhar36mts_Communications <-
wilcox.test(npe_36mts_Communications$BHAR36mnd)
median_npe_bhar36mts_Communications <-
median(npe_36mts_Communications$BHAR36mnd)
head(willcox_npe_bhar36mts_Communications)
head(median_npe_bhar36mts_Communications)

willcox_npe_bhar12mts_ConsumerCyclical <-
wilcox.test(npe_12mts_ConsumerCyclical$BHAR12mnd)
median_npe_bhar12mts_ConsumerCyclical <-
median(npe_12mts_ConsumerCyclical$BHAR12mnd)
head(willcox_npe_bhar12mts_ConsumerCyclical)
head(median_npe_bhar12mts_ConsumerCyclical)
willcox_npe_bhar24mts_ConsumerCyclical <-
wilcox.test(npe_24mts_ConsumerCyclical$BHAR24mnd)
median_npe_bhar24mts_ConsumerCyclical <-
median(npe_24mts_ConsumerCyclical$BHAR24mnd)
head(willcox_npe_bhar24mts_ConsumerCyclical)
head(median_npe_bhar24mts_ConsumerCyclical)
willcox_npe_bhar36mts_ConsumerCyclical <-
wilcox.test(npe_36mts_ConsumerCyclical$BHAR36mnd)
median_npe_bhar36mts_ConsumerCyclical <-
median(npe_36mts_ConsumerCyclical$BHAR36mnd)
head(willcox_npe_bhar36mts_ConsumerCyclical)
head(median_npe_bhar36mts_ConsumerCyclical)

willcox_npe_bhar12mts_ConsumerNonCyclical <-
wilcox.test(npe_12mts_ConsumerNonCyclical$BHAR12mnd)
median_npe_bhar12mts_ConsumerNonCyclical <-
median(npe_12mts_ConsumerNonCyclical$BHAR12mnd)
head(willcox_npe_bhar12mts_ConsumerNonCyclical)
head(median_npe_bhar12mts_ConsumerNonCyclical)
willcox_npe_bhar24mts_ConsumerNonCyclical <-
wilcox.test(npe_24mts_ConsumerNonCyclical$BHAR24mnd)
median_npe_bhar24mts_ConsumerNonCyclical <-
median(npe_24mts_ConsumerNonCyclical$BHAR24mnd)
head(willcox_npe_bhar24mts_ConsumerNonCyclical)
head(median_npe_bhar24mts_ConsumerNonCyclical)
willcox_npe_bhar36mts_ConsumerNonCyclical <-
wilcox.test(npe_36mts_ConsumerNonCyclical$BHAR36mnd)
median_npe_bhar36mts_ConsumerNonCyclical <-
median(npe_36mts_ConsumerNonCyclical$BHAR36mnd)
head(willcox_npe_bhar36mts_ConsumerNonCyclical)
head(median_npe_bhar36mts_ConsumerNonCyclical)

willcox_npe_bhar12mts_Financial <-
wilcox.test(npe_12mts_Financial$BHAR12mnd)
median_npe_bhar12mts_Financial <- median(npe_12mts_Financial$BHAR12mnd)
head(willcox_npe_bhar12mts_Financial)
head(median_npe_bhar12mts_Financial)

```

```

willcox_npe_bhar24mts_Financial <-
wilcox.test(npe_24mts_Financial$BHAR24mnd)
median_npe_bhar24mts_Financial <- median(npe_24mts_Financial$BHAR24mnd)
head(willcox_npe_bhar24mts_Financial)
head(median_npe_bhar24mts_Financial)
willcox_npe_bhar36mts_Financial <-
wilcox.test(npe_36mts_Financial$BHAR36mnd)
median_npe_bhar36mts_Financial <- median(npe_36mts_Financial$BHAR36mnd)
head(willcox_npe_bhar36mts_Financial)
head(median_npe_bhar36mts_Financial)

willcox_npe_bhar12mts_Technology <-
wilcox.test(npe_12mts_Technology$BHAR12mnd)
median_npe_bhar12mts_Technology <- median(npe_12mts_Technology$BHAR12mnd)
head(willcox_npe_bhar12mts_Technology)
head(median_npe_bhar12mts_Technology)
willcox_npe_bhar24mts_Technology <-
wilcox.test(npe_24mts_Technology$BHAR24mnd)
median_npe_bhar24mts_Technology <- median(npe_24mts_Technology$BHAR24mnd)
head(willcox_npe_bhar24mts_Technology)
head(median_npe_bhar24mts_Technology)
willcox_npe_bhar36mts_Technology <-
wilcox.test(npe_36mts_Technology$BHAR36mnd)
median_npe_bhar36mts_Technology <- median(npe_36mts_Technology$BHAR36mnd)
head(willcox_npe_bhar36mts_Technology)
head(median_npe_bhar36mts_Technology)

willcox_npe_bhar12mts_Energy <- wilcox.test(npe_12mts_Energy$BHAR12mnd)
median_npe_bhar12mts_Energy <- median(npe_12mts_Energy$BHAR12mnd)
head(willcox_npe_bhar12mts_Energy)
head(median_npe_bhar12mts_Energy)
willcox_npe_bhar24mts_Energy <- wilcox.test(npe_24mts_Energy$BHAR24mnd)
median_npe_bhar24mts_Energy <- median(npe_24mts_Energy$BHAR24mnd)
head(willcox_npe_bhar24mts_Energy)
head(median_npe_bhar24mts_Energy)
willcox_npe_bhar36mts_Energy <- wilcox.test(npe_36mts_Energy$BHAR36mnd)
median_npe_bhar36mts_Energy <- median(npe_36mts_Energy$BHAR36mnd)
head(willcox_npe_bhar36mts_Energy)
head(median_npe_bhar36mts_Energy)

willcox_npe_bhar12mts_Industrial <-
wilcox.test(npe_12mts_Industrial$BHAR12mnd)
median_npe_bhar12mts_Industrial <- median(npe_12mts_Industrial$BHAR12mnd)
head(willcox_npe_bhar12mts_Industrial)
head(median_npe_bhar12mts_Industrial)
willcox_npe_bhar24mts_Industrial <-
wilcox.test(npe_24mts_Industrial$BHAR24mnd)
median_npe_bhar24mts_Industrial <- median(npe_24mts_Industrial$BHAR24mnd)
head(willcox_npe_bhar24mts_Industrial)
head(median_npe_bhar24mts_Industrial)
willcox_npe_bhar36mts_Industrial <-
wilcox.test(npe_36mts_Industrial$BHAR36mnd)
median_npe_bhar36mts_Industrial <- median(npe_36mts_Industrial$BHAR36mnd)
head(willcox_npe_bhar36mts_Industrial)
head(median_npe_bhar36mts_Industrial)

willcox_npe_bhar12mts_Uutilities <-
wilcox.test(npe_12mts_Uutilities$BHAR12mnd)

```

```
median_npe_bhar12mts_Utillities <- median(npe_12mts_Utillities$BHAR12mnd)
head(willcox_npe_bhar12mts_Utillities)
head(median_npe_bhar12mts_Utillities)
willcox_npe_bhar24mts_Utillities <-
wilcox.test(npe_24mts_Utillities$BHAR24mnd)
median_npe_bhar24mts_Utillities <- median(npe_24mts_Utillities$BHAR24mnd)
head(willcox_npe_bhar24mts_Utillities)
head(median_npe_bhar24mts_Utillities)
willcox_npe_bhar36mts_Utillities <-
wilcox.test(npe_36mts_Utillities$BHAR36mnd)
median_npe_bhar36mts_Utillities <- median(npe_36mts_Utillities$BHAR36mnd)
head(willcox_npe_bhar36mts_Utillities)
head(median_npe_bhar36mts_Utillities)
```

```
willcox_npe_car12mts_basicmaterials <-
wilcox.test(npe_12mts_basicmaterials$CAR12mnd)
median_npe_car12mts_basicmaterials <-
median(npe_12mts_basicmaterials$CAR12mnd)
head(willcox_npe_car12mts_basicmaterials)
head(median_npe_car12mts_basicmaterials)
willcox_npe_car24mts_basicmaterials <-
wilcox.test(npe_24mts_basicmaterials$CAR24mnd)
median_npe_car24mts_basicmaterials <-
median(npe_24mts_basicmaterials$CAR24mnd)
head(willcox_npe_car24mts_basicmaterials)
head(median_npe_car24mts_basicmaterials)
willcox_npe_car36mts_basicmaterials <-
wilcox.test(npe_36mts_basicmaterials$CAR36mnd)
median_npe_car36mts_basicmaterials <-
median(npe_36mts_basicmaterials$CAR36mnd)
head(willcox_npe_car36mts_basicmaterials)
head(median_npe_car36mts_basicmaterials)
```

```
willcox_npe_car12mts_Communications <-
wilcox.test(npe_12mts_Communications$CAR12mnd)
median_npe_car12mts_Communications <-
median(npe_12mts_Communications$CAR12mnd)
head(willcox_npe_car12mts_Communications)
head(median_npe_car12mts_Communications)
willcox_npe_car24mts_Communications <-
wilcox.test(npe_24mts_Communications$CAR24mnd)
median_npe_car24mts_Communications <-
median(npe_24mts_Communications$CAR24mnd)
head(willcox_npe_car24mts_Communications)
head(median_npe_car24mts_Communications)
willcox_npe_car36mts_Communications <-
wilcox.test(npe_36mts_Communications$CAR36mnd)
median_npe_car36mts_Communications <-
median(npe_36mts_Communications$CAR36mnd)
head(willcox_npe_car36mts_Communications)
head(median_npe_car36mts_Communications)
```

```
willcox_npe_car12mts_ConsumerCyclical <-
wilcox.test(npe_12mts_ConsumerCyclical$CAR12mnd)
median_npe_car12mts_ConsumerCyclical <-
median(npe_12mts_ConsumerCyclical$CAR12mnd)
```

```

head(willcox_npe_car12mts_ConsumerCyclical)
head(median_npe_car12mts_ConsumerCyclical)
willcox_npe_car24mts_ConsumerCyclical <-
wilcox.test(npe_24mts_ConsumerCyclical$CAR24mnd)
median_npe_car24mts_ConsumerCyclical <-
median(npe_24mts_ConsumerCyclical$CAR24mnd)
head(willcox_npe_car24mts_ConsumerCyclical)
head(median_npe_car24mts_ConsumerCyclical)
willcox_npe_car36mts_ConsumerCyclical <-
wilcox.test(npe_36mts_ConsumerCyclical$CAR36mnd)
median_npe_car36mts_ConsumerCyclical <-
median(npe_36mts_ConsumerCyclical$CAR36mnd)
head(willcox_npe_car36mts_ConsumerCyclical)
head(median_npe_car36mts_ConsumerCyclical)

willcox_npe_car12mts_ConsumerNonCyclical <-
wilcox.test(npe_12mts_ConsumerNonCyclical$CAR12mnd)
median_npe_car12mts_ConsumerNonCyclical <-
median(npe_12mts_ConsumerNonCyclical$CAR12mnd)
head(willcox_npe_car12mts_ConsumerNonCyclical)
head(median_npe_car12mts_ConsumerNonCyclical)
willcox_npe_car24mts_ConsumerNonCyclical <-
wilcox.test(npe_24mts_ConsumerNonCyclical$CAR24mnd)
median_npe_car24mts_ConsumerNonCyclical <-
median(npe_24mts_ConsumerNonCyclical$CAR24mnd)
head(willcox_npe_car24mts_ConsumerNonCyclical)
head(median_npe_car24mts_ConsumerNonCyclical)
willcox_npe_car36mts_ConsumerNonCyclical <-
wilcox.test(npe_36mts_ConsumerNonCyclical$CAR36mnd)
median_npe_car36mts_ConsumerNonCyclical <-
median(npe_36mts_ConsumerNonCyclical$CAR36mnd)
head(willcox_npe_car36mts_ConsumerNonCyclical)
head(median_npe_car36mts_ConsumerNonCyclical)

willcox_npe_car12mts_Financial <- wilcox.test(npe_12mts_Financial$CAR12mnd)
median_npe_car12mts_Financial <- median(npe_12mts_Financial$CAR12mnd)
head(willcox_npe_car12mts_Financial)
head(median_npe_car12mts_Financial)
willcox_npe_car24mts_Financial <- wilcox.test(npe_24mts_Financial$CAR24mnd)
median_npe_car24mts_Financial <- median(npe_24mts_Financial$CAR24mnd)
head(willcox_npe_car24mts_Financial)
head(median_npe_car24mts_Financial)
willcox_npe_car36mts_Financial <- wilcox.test(npe_36mts_Financial$CAR36mnd)
median_npe_car36mts_Financial <- median(npe_36mts_Financial$CAR36mnd)
head(willcox_npe_car36mts_Financial)
head(median_npe_car36mts_Financial)

willcox_npe_car12mts_Technology <-
wilcox.test(npe_12mts_Technology$CAR12mnd)
median_npe_car12mts_Technology <- median(npe_12mts_Technology$CAR12mnd)
head(willcox_npe_car12mts_Technology)
head(median_npe_car12mts_Technology)
willcox_npe_car24mts_Technology <-
wilcox.test(npe_24mts_Technology$CAR24mnd)
median_npe_car24mts_Technology <- median(npe_24mts_Technology$CAR24mnd)
head(willcox_npe_car24mts_Technology)
head(median_npe_car24mts_Technology)

```

```

willcox_npe_car36mts_Technology <-
wilcox.test(npe_36mts_Technology$CAR36mnd)
median_npe_car36mts_Technology <- median(npe_36mts_Technology$CAR36mnd)
head(willcox_npe_car36mts_Technology)
head(median_npe_car36mts_Technology)

willcox_npe_car12mts_Energy <- wilcox.test(npe_12mts_Energy$CAR12mnd)
median_npe_car12mts_Energy <- median(npe_12mts_Energy$CAR12mnd)
head(willcox_npe_car12mts_Energy)
head(median_npe_car12mts_Energy)
willcox_npe_car24mts_Energy <- wilcox.test(npe_24mts_Energy$CAR24mnd)
median_npe_car24mts_Energy <- median(npe_24mts_Energy$CAR24mnd)
head(willcox_npe_car24mts_Energy)
head(median_npe_car24mts_Energy)
willcox_npe_car36mts_Energy <- wilcox.test(npe_36mts_Energy$CAR36mnd)
median_npe_car36mts_Energy <- median(npe_36mts_Energy$CAR36mnd)
head(willcox_npe_car36mts_Energy)
head(median_npe_car36mts_Energy)

willcox_npe_car12mts_Industrial <-
wilcox.test(npe_12mts_Industrial$CAR12mnd)
median_npe_car12mts_Industrial <- median(npe_12mts_Industrial$CAR12mnd)
head(willcox_npe_car12mts_Industrial)
head(median_npe_car12mts_Industrial)
willcox_npe_car24mts_Industrial <-
wilcox.test(npe_24mts_Industrial$CAR24mnd)
median_npe_car24mts_Industrial <- median(npe_24mts_Industrial$CAR24mnd)
head(willcox_npe_car24mts_Industrial)
head(median_npe_car24mts_Industrial)
willcox_npe_car36mts_Industrial <-
wilcox.test(npe_36mts_Industrial$CAR36mnd)
median_npe_car36mts_Industrial <- median(npe_36mts_Industrial$CAR36mnd)
head(willcox_npe_car36mts_Industrial)
head(median_npe_car36mts_Industrial)

willcox_npe_car12mts_Utillities <- wilcox.test(npe_12mts_Utillities$CAR12mnd)
median_npe_car12mts_Utillities <- median(npe_12mts_Utillities$CAR12mnd)
head(willcox_npe_car12mts_Utillities)
head(median_npe_car12mts_Utillities)
willcox_npe_car24mts_Utillities <- wilcox.test(npe_24mts_Utillities$CAR24mnd)
median_npe_car24mts_Utillities <- median(npe_24mts_Utillities$CAR24mnd)
head(willcox_npe_car24mts_Utillities)
head(median_npe_car24mts_Utillities)
willcox_npe_car36mts_Utillities <- wilcox.test(npe_36mts_Utillities$CAR36mnd)
median_npe_car36mts_Utillities <- median(npe_36mts_Utillities$CAR36mnd)
head(willcox_npe_car36mts_Utillities)
head(median_npe_car36mts_Utillities)

#PE
willcox_pe_bhar12mts_basicmaterials <-
wilcox.test(pe_12mts_basicmaterials$BHAR12mnd)
median_pe_bhar12mts_basicmaterials <-
median(pe_12mts_basicmaterials$BHAR12mnd)
head(willcox_pe_bhar12mts_basicmaterials)
head(median_pe_bhar12mts_basicmaterials)

```

```
willcox_pe_bhar24mts_basicmaterials <-
wilcox.test(pe_24mts_basicmaterials$BHAR24mnd)
median_pe_bhar24mts_basicmaterials <-
median(pe_24mts_basicmaterials$BHAR24mnd)
head(willcox_pe_bhar24mts_basicmaterials)
head(median_pe_bhar24mts_basicmaterials)
willcox_pe_bhar36mts_basicmaterials <-
wilcox.test(pe_36mts_basicmaterials$BHAR36mnd)
median_pe_bhar36mts_basicmaterials <-
median(pe_36mts_basicmaterials$BHAR36mnd)
head(willcox_pe_bhar36mts_basicmaterials)
head(median_pe_bhar36mts_basicmaterials)
```

```
willcox_pe_bhar12mts_Communications <-
wilcox.test(pe_12mts_Communications$BHAR12mnd)
median_pe_bhar12mts_Communications <-
median(pe_12mts_Communications$BHAR12mnd)
head(willcox_pe_bhar12mts_Communications)
head(median_pe_bhar12mts_Communications)
willcox_pe_bhar24mts_Communications <-
wilcox.test(pe_24mts_Communications$BHAR24mnd)
median_pe_bhar24mts_Communications <-
median(pe_24mts_Communications$BHAR24mnd)
head(willcox_pe_bhar24mts_Communications)
head(median_pe_bhar24mts_Communications)
willcox_pe_bhar36mts_Communications <-
wilcox.test(pe_36mts_Communications$BHAR36mnd)
median_pe_bhar36mts_Communications <-
median(pe_36mts_Communications$BHAR36mnd)
head(willcox_pe_bhar36mts_Communications)
head(median_pe_bhar36mts_Communications)
```

```
willcox_pe_bhar12mts_ConsumerCyclical <-
wilcox.test(pe_12mts_ConsumerCyclical$BHAR12mnd)
median_pe_bhar12mts_ConsumerCyclical <-
median(pe_12mts_ConsumerCyclical$BHAR12mnd)
head(willcox_pe_bhar12mts_ConsumerCyclical)
head(median_pe_bhar12mts_ConsumerCyclical)
willcox_pe_bhar24mts_ConsumerCyclical <-
wilcox.test(pe_24mts_ConsumerCyclical$BHAR24mnd)
median_pe_bhar24mts_ConsumerCyclical <-
median(pe_24mts_ConsumerCyclical$BHAR24mnd)
head(willcox_pe_bhar24mts_ConsumerCyclical)
head(median_pe_bhar24mts_ConsumerCyclical)
willcox_pe_bhar36mts_ConsumerCyclical <-
wilcox.test(pe_36mts_ConsumerCyclical$BHAR36mnd)
median_pe_bhar36mts_ConsumerCyclical <-
median(pe_36mts_ConsumerCyclical$BHAR36mnd)
head(willcox_pe_bhar36mts_ConsumerCyclical)
head(median_pe_bhar36mts_ConsumerCyclical)
```

```
willcox_pe_bhar12mts_ConsumerNonCyclical <-
wilcox.test(pe_12mts_ConsumerNonCyclical$BHAR12mnd)
median_pe_bhar12mts_ConsumerNonCyclical <-
median(pe_12mts_ConsumerNonCyclical$BHAR12mnd)
head(willcox_pe_bhar12mts_ConsumerNonCyclical)
head(median_pe_bhar12mts_ConsumerNonCyclical)
```

```

willcox_pe_bhar24mts_ConsumerNonCyclical <-
wilcox.test(pe_24mts_ConsumerNonCyclical$BHAR24mnd)
median_pe_bhar24mts_ConsumerNonCyclical <-
median(pe_24mts_ConsumerNonCyclical$BHAR24mnd)
head(willcox_pe_bhar24mts_ConsumerNonCyclical)
head(median_pe_bhar24mts_ConsumerNonCyclical)
willcox_pe_bhar36mts_ConsumerNonCyclical <-
wilcox.test(pe_36mts_ConsumerNonCyclical$BHAR36mnd)
median_pe_bhar36mts_ConsumerNonCyclical <-
median(pe_36mts_ConsumerNonCyclical$BHAR36mnd)
head(willcox_pe_bhar36mts_ConsumerNonCyclical)
head(median_pe_bhar36mts_ConsumerNonCyclical)

willcox_pe_bhar12mts_Financial <- wilcox.test(pe_12mts_Financial$BHAR12mnd)
median_pe_bhar12mts_Financial <- median(pe_12mts_Financial$BHAR12mnd)
head(willcox_pe_bhar12mts_Financial)
head(median_pe_bhar12mts_Financial)
willcox_pe_bhar24mts_Financial <- wilcox.test(pe_24mts_Financial$BHAR24mnd)
median_pe_bhar24mts_Financial <- median(pe_24mts_Financial$BHAR24mnd)
head(willcox_pe_bhar24mts_Financial)
head(median_pe_bhar24mts_Financial)
willcox_pe_bhar36mts_Financial <- wilcox.test(pe_36mts_Financial$BHAR36mnd)
median_pe_bhar36mts_Financial <- median(pe_36mts_Financial$BHAR36mnd)
head(willcox_pe_bhar36mts_Financial)
head(median_pe_bhar36mts_Financial)

willcox_pe_bhar12mts_Technology <-
wilcox.test(pe_12mts_Technology$BHAR12mnd)
median_pe_bhar12mts_Technology <- median(pe_12mts_Technology$BHAR12mnd)
head(willcox_pe_bhar12mts_Technology)
head(median_pe_bhar12mts_Technology)
willcox_pe_bhar24mts_Technology <-
wilcox.test(pe_24mts_Technology$BHAR24mnd)
median_pe_bhar24mts_Technology <- median(pe_24mts_Technology$BHAR24mnd)
head(willcox_pe_bhar24mts_Technology)
head(median_pe_bhar24mts_Technology)
willcox_pe_bhar36mts_Technology <-
wilcox.test(pe_36mts_Technology$BHAR36mnd)
median_pe_bhar36mts_Technology <- median(pe_36mts_Technology$BHAR36mnd)
head(willcox_pe_bhar36mts_Technology)
head(median_pe_bhar36mts_Technology)

willcox_pe_bhar12mts_Energy <- wilcox.test(pe_12mts_Energy$BHAR12mnd)
median_pe_bhar12mts_Energy <- median(pe_12mts_Energy$BHAR12mnd)
head(willcox_pe_bhar12mts_Energy)
head(median_pe_bhar12mts_Energy)
willcox_pe_bhar24mts_Energy <- wilcox.test(pe_24mts_Energy$BHAR24mnd)
median_pe_bhar24mts_Energy <- median(pe_24mts_Energy$BHAR24mnd)
head(willcox_pe_bhar24mts_Energy)
head(median_pe_bhar24mts_Energy)
willcox_pe_bhar36mts_Energy <- wilcox.test(pe_36mts_Energy$BHAR36mnd)
median_pe_bhar36mts_Energy <- median(pe_36mts_Energy$BHAR36mnd)
head(willcox_pe_bhar36mts_Energy)
head(median_pe_bhar36mts_Energy)

willcox_pe_bhar12mts_Industrial <-
wilcox.test(pe_12mts_Industrial$BHAR12mnd)
median_pe_bhar12mts_Industrial <- median(pe_12mts_Industrial$BHAR12mnd)

```



```

head(willcox_pe_bhar12mts_Industrial)
head(median_pe_bhar12mts_Industrial)
willcox_pe_bhar24mts_Industrial <-
wilcox.test(pe_24mts_Industrial$BHAR24mnd)
median_pe_bhar24mts_Industrial <- median(pe_24mts_Industrial$BHAR24mnd)
head(willcox_pe_bhar24mts_Industrial)
head(median_pe_bhar24mts_Industrial)
willcox_pe_bhar36mts_Industrial <-
wilcox.test(pe_36mts_Industrial$BHAR36mnd)
median_pe_bhar36mts_Industrial <- median(pe_36mts_Industrial$BHAR36mnd)
head(willcox_pe_bhar36mts_Industrial)
head(median_pe_bhar36mts_Industrial)

willcox_pe_bhar12mts_Utillities <- wilcox.test(pe_12mts_Utillities$BHAR12mnd)
median_pe_bhar12mts_Utillities <- median(pe_12mts_Utillities$BHAR12mnd)
head(willcox_pe_bhar12mts_Utillities)
head(median_pe_bhar12mts_Utillities)
willcox_pe_bhar24mts_Utillities <- wilcox.test(pe_24mts_Utillities$BHAR24mnd)
median_pe_bhar24mts_Utillities <- median(pe_24mts_Utillities$BHAR24mnd)
head(willcox_pe_bhar24mts_Utillities)
head(median_pe_bhar24mts_Utillities)
willcox_pe_bhar36mts_Utillities <- wilcox.test(pe_36mts_Utillities$BHAR36mnd)
median_pe_bhar36mts_Utillities <- median(pe_36mts_Utillities$BHAR36mnd)
head(willcox_pe_bhar36mts_Utillities)
head(median_pe_bhar36mts_Utillities)

willcox_pe_car12mts_basicmaterials <-
wilcox.test(pe_12mts_basicmaterials$CAR12mnd)
median_pe_car12mts_basicmaterials <-
median(pe_12mts_basicmaterials$CAR12mnd)
head(willcox_pe_car12mts_basicmaterials)
head(median_pe_car12mts_basicmaterials)
willcox_pe_car24mts_basicmaterials <-
wilcox.test(pe_24mts_basicmaterials$CAR24mnd)
median_pe_car24mts_basicmaterials <-
median(pe_24mts_basicmaterials$CAR24mnd)
head(willcox_pe_car24mts_basicmaterials)
head(median_pe_car24mts_basicmaterials)
willcox_pe_car36mts_basicmaterials <-
wilcox.test(pe_36mts_basicmaterials$CAR36mnd)
median_pe_car36mts_basicmaterials <-
median(pe_36mts_basicmaterials$CAR36mnd)
head(willcox_pe_car36mts_basicmaterials)
head(median_pe_car36mts_basicmaterials)

willcox_pe_car12mts_Communications <-
wilcox.test(pe_12mts_Communications$CAR12mnd)
median_pe_car12mts_Communications <-
median(pe_12mts_Communications$CAR12mnd)
head(willcox_pe_car12mts_Communications)
head(median_pe_car12mts_Communications)
willcox_pe_car24mts_Communications <-
wilcox.test(pe_24mts_Communications$CAR24mnd)
median_pe_car24mts_Communications <-
median(pe_24mts_Communications$CAR24mnd)
head(willcox_pe_car24mts_Communications)
head(median_pe_car24mts_Communications)

```

```
willcox_pe_car36mts_Communications <-  
wilcox.test(pe_36mts_Communications$CAR36mnd)  
median_pe_car36mts_Communications <-  
median(pe_36mts_Communications$CAR36mnd)  
head(willcox_pe_car36mts_Communications)  
head(median_pe_car36mts_Communications)
```

```
willcox_pe_car12mts_ConsumerCyclical <-  
wilcox.test(pe_12mts_ConsumerCyclical$CAR12mnd)  
median_pe_car12mts_ConsumerCyclical <-  
median(pe_12mts_ConsumerCyclical$CAR12mnd)  
head(willcox_pe_car12mts_ConsumerCyclical)  
head(median_pe_car12mts_ConsumerCyclical)  
willcox_pe_car24mts_ConsumerCyclical <-  
wilcox.test(pe_24mts_ConsumerCyclical$CAR24mnd)  
median_pe_car24mts_ConsumerCyclical <-  
median(pe_24mts_ConsumerCyclical$CAR24mnd)  
head(willcox_pe_car24mts_ConsumerCyclical)  
head(median_pe_car24mts_ConsumerCyclical)  
willcox_pe_car36mts_ConsumerCyclical <-  
wilcox.test(pe_36mts_ConsumerCyclical$CAR36mnd)  
median_pe_car36mts_ConsumerCyclical <-  
median(pe_36mts_ConsumerCyclical$CAR36mnd)  
head(willcox_pe_car36mts_ConsumerCyclical)  
head(median_pe_car36mts_ConsumerCyclical)
```

```
willcox_pe_car12mts_ConsumerNonCyclical <-  
wilcox.test(pe_12mts_ConsumerNonCyclical$CAR12mnd)  
median_pe_car12mts_ConsumerNonCyclical <-  
median(pe_12mts_ConsumerNonCyclical$CAR12mnd)  
head(willcox_pe_car12mts_ConsumerNonCyclical)  
head(median_pe_car12mts_ConsumerNonCyclical)  
willcox_pe_car24mts_ConsumerNonCyclical <-  
wilcox.test(pe_24mts_ConsumerNonCyclical$CAR24mnd)  
median_pe_car24mts_ConsumerNonCyclical <-  
median(pe_24mts_ConsumerNonCyclical$CAR24mnd)  
head(willcox_pe_car24mts_ConsumerNonCyclical)  
head(median_pe_car24mts_ConsumerNonCyclical)  
willcox_pe_car36mts_ConsumerNonCyclical <-  
wilcox.test(pe_36mts_ConsumerNonCyclical$CAR36mnd)  
median_pe_car36mts_ConsumerNonCyclical <-  
median(pe_36mts_ConsumerNonCyclical$CAR36mnd)  
head(willcox_pe_car36mts_ConsumerNonCyclical)  
head(median_pe_car36mts_ConsumerNonCyclical)
```

```
willcox_pe_car12mts_Financial <- wilcox.test(pe_12mts_Financial$CAR12mnd)  
median_pe_car12mts_Financial <- median(pe_12mts_Financial$CAR12mnd)  
head(willcox_pe_car12mts_Financial)  
head(median_pe_car12mts_Financial)  
willcox_pe_car24mts_Financial <- wilcox.test(pe_24mts_Financial$CAR24mnd)  
median_pe_car24mts_Financial <- median(pe_24mts_Financial$CAR24mnd)  
head(willcox_pe_car24mts_Financial)  
head(median_pe_car24mts_Financial)  
willcox_pe_car36mts_Financial <- wilcox.test(pe_36mts_Financial$CAR36mnd)  
median_pe_car36mts_Financial <- median(pe_36mts_Financial$CAR36mnd)  
head(willcox_pe_car36mts_Financial)  
head(median_pe_car36mts_Financial)
```

```
willcox_pe_car12mts_Technology <- wilcox.test(pe_12mts_Technology$CAR12mnd)
median_pe_car12mts_Technology <- median(pe_12mts_Technology$CAR12mnd)
head(willcox_pe_car12mts_Technology)
head(median_pe_car12mts_Technology)
willcox_pe_car24mts_Technology <- wilcox.test(pe_24mts_Technology$CAR24mnd)
median_pe_car24mts_Technology <- median(pe_24mts_Technology$CAR24mnd)
head(willcox_pe_car24mts_Technology)
head(median_pe_car24mts_Technology)
willcox_pe_car36mts_Technology <- wilcox.test(pe_36mts_Technology$CAR36mnd)
median_pe_car36mts_Technology <- median(pe_36mts_Technology$CAR36mnd)
head(willcox_pe_car36mts_Technology)
head(median_pe_car36mts_Technology)
```

```
willcox_pe_car12mts_Energy <- wilcox.test(pe_12mts_Energy$CAR12mnd)
median_pe_car12mts_Energy <- median(pe_12mts_Energy$CAR12mnd)
head(willcox_pe_car12mts_Energy)
head(median_pe_car12mts_Energy)
willcox_pe_car24mts_Energy <- wilcox.test(pe_24mts_Energy$CAR24mnd)
median_pe_car24mts_Energy <- median(pe_24mts_Energy$CAR24mnd)
head(willcox_pe_car24mts_Energy)
head(median_pe_car24mts_Energy)
willcox_pe_car36mts_Energy <- wilcox.test(pe_36mts_Energy$CAR36mnd)
median_pe_car36mts_Energy <- median(pe_36mts_Energy$CAR36mnd)
head(willcox_pe_car36mts_Energy)
head(median_pe_car36mts_Energy)
```

```
willcox_pe_car12mts_Industrial <- wilcox.test(pe_12mts_Industrial$CAR12mnd)
median_pe_car12mts_Industrial <- median(pe_12mts_Industrial$CAR12mnd)
head(willcox_pe_car12mts_Industrial)
head(median_pe_car12mts_Industrial)
willcox_pe_car24mts_Industrial <- wilcox.test(pe_24mts_Industrial$CAR24mnd)
median_pe_car24mts_Industrial <- median(pe_24mts_Industrial$CAR24mnd)
head(willcox_pe_car24mts_Industrial)
head(median_pe_car24mts_Industrial)
willcox_pe_car36mts_Industrial <- wilcox.test(pe_36mts_Industrial$CAR36mnd)
median_pe_car36mts_Industrial <- median(pe_36mts_Industrial$CAR36mnd)
head(willcox_pe_car36mts_Industrial)
head(median_pe_car36mts_Industrial)
```

```
willcox_pe_car12mts_Utilities <- wilcox.test(pe_12mts_Utilities$CAR12mnd)
median_pe_car12mts_Utilities <- median(pe_12mts_Utilities$CAR12mnd)
head(willcox_pe_car12mts_Utilities)
head(median_pe_car12mts_Utilities)
willcox_pe_car24mts_Utilities <- wilcox.test(pe_24mts_Utilities$CAR24mnd)
median_pe_car24mts_Utilities <- median(pe_24mts_Utilities$CAR24mnd)
head(willcox_pe_car24mts_Utilities)
head(median_pe_car24mts_Utilities)
willcox_pe_car36mts_Utilities <- wilcox.test(pe_36mts_Utilities$CAR36mnd)
median_pe_car36mts_Utilities <- median(pe_36mts_Utilities$CAR36mnd)
head(willcox_pe_car36mts_Utilities)
head(median_pe_car36mts_Utilities)
```

```
#VC
```

```
willcox_vc_bhar12mts_basicmaterials <-
wilcox.test(vc_12mts_basicmaterials$BHAR12mnd)
median_vc_bhar12mts_basicmaterials <-
median(vc_12mts_basicmaterials$BHAR12mnd)
```

```

head(willcox_vc_bhar12mts_basicmaterials)
head(median_vc_bhar12mts_basicmaterials)
willcox_vc_bhar24mts_basicmaterials <-
wilcox.test(vc_24mts_basicmaterials$BHAR24mnd)
median_vc_bhar24mts_basicmaterials <-
median(vc_24mts_basicmaterials$BHAR24mnd)
head(willcox_vc_bhar24mts_basicmaterials)
head(median_vc_bhar24mts_basicmaterials)
willcox_vc_bhar36mts_basicmaterials <-
wilcox.test(vc_36mts_basicmaterials$BHAR36mnd)
median_vc_bhar36mts_basicmaterials <-
median(vc_36mts_basicmaterials$BHAR36mnd)
head(willcox_vc_bhar36mts_basicmaterials)
head(median_vc_bhar36mts_basicmaterials)

willcox_vc_bhar12mts_Communications <-
wilcox.test(vc_12mts_Communications$BHAR12mnd)
median_vc_bhar12mts_Communications <-
median(vc_12mts_Communications$BHAR12mnd)
head(willcox_vc_bhar12mts_Communications)
head(median_vc_bhar12mts_Communications)
willcox_vc_bhar24mts_Communications <-
wilcox.test(vc_24mts_Communications$BHAR24mnd)
median_vc_bhar24mts_Communications <-
median(vc_24mts_Communications$BHAR24mnd)
head(willcox_vc_bhar24mts_Communications)
head(median_vc_bhar24mts_Communications)
willcox_vc_bhar36mts_Communications <-
wilcox.test(vc_36mts_Communications$BHAR36mnd)
median_vc_bhar36mts_Communications <-
median(vc_36mts_Communications$BHAR36mnd)
head(willcox_vc_bhar36mts_Communications)
head(median_vc_bhar36mts_Communications)

willcox_vc_bhar12mts_ConsumerCyclical <-
wilcox.test(vc_12mts_ConsumerCyclical$BHAR12mnd)
median_vc_bhar12mts_ConsumerCyclical <-
median(vc_12mts_ConsumerCyclical$BHAR12mnd)
head(willcox_vc_bhar12mts_ConsumerCyclical)
head(median_vc_bhar12mts_ConsumerCyclical)
willcox_vc_bhar24mts_ConsumerCyclical <-
wilcox.test(vc_24mts_ConsumerCyclical$BHAR24mnd)
median_vc_bhar24mts_ConsumerCyclical <-
median(vc_24mts_ConsumerCyclical$BHAR24mnd)
head(willcox_vc_bhar24mts_ConsumerCyclical)
head(median_vc_bhar24mts_ConsumerCyclical)
willcox_vc_bhar36mts_ConsumerCyclical <-
wilcox.test(vc_36mts_ConsumerCyclical$BHAR36mnd)
median_vc_bhar36mts_ConsumerCyclical <-
median(vc_36mts_ConsumerCyclical$BHAR36mnd)
head(willcox_vc_bhar36mts_ConsumerCyclical)
head(median_vc_bhar36mts_ConsumerCyclical)

willcox_vc_bhar12mts_ConsumerNonCyclical <-
wilcox.test(vc_12mts_ConsumerNonCyclical$BHAR12mnd)
median_vc_bhar12mts_ConsumerNonCyclical <-
median(vc_12mts_ConsumerNonCyclical$BHAR12mnd)

```

```

head(willcox_vc_bhar12mts_ConsumerNonCyclical)
head(median_vc_bhar12mts_ConsumerNonCyclical)
willcox_vc_bhar24mts_ConsumerNonCyclical <-
wilcox.test(vc_24mts_ConsumerNonCyclical$BHAR24mnd)
median_vc_bhar24mts_ConsumerNonCyclical <-
median(vc_24mts_ConsumerNonCyclical$BHAR24mnd)
head(willcox_vc_bhar24mts_ConsumerNonCyclical)
head(median_vc_bhar24mts_ConsumerNonCyclical)
willcox_vc_bhar36mts_ConsumerNonCyclical <-
wilcox.test(vc_36mts_ConsumerNonCyclical$BHAR36mnd)
median_vc_bhar36mts_ConsumerNonCyclical <-
median(vc_36mts_ConsumerNonCyclical$BHAR36mnd)
head(willcox_vc_bhar36mts_ConsumerNonCyclical)
head(median_vc_bhar36mts_ConsumerNonCyclical)

willcox_vc_bhar12mts_Financial <- wilcox.test(vc_12mts_Financial$BHAR12mnd)
median_vc_bhar12mts_Financial <- median(vc_12mts_Financial$BHAR12mnd)
head(willcox_vc_bhar12mts_Financial)
head(median_vc_bhar12mts_Financial)
willcox_vc_bhar24mts_Financial <- wilcox.test(vc_24mts_Financial$BHAR24mnd)
median_vc_bhar24mts_Financial <- median(vc_24mts_Financial$BHAR24mnd)
head(willcox_vc_bhar24mts_Financial)
head(median_vc_bhar24mts_Financial)
willcox_vc_bhar36mts_Financial <- wilcox.test(vc_36mts_Financial$BHAR36mnd)
median_vc_bhar36mts_Financial <- median(vc_36mts_Financial$BHAR36mnd)
head(willcox_vc_bhar36mts_Financial)
head(median_vc_bhar36mts_Financial)

willcox_vc_bhar12mts_Technology <-
wilcox.test(vc_12mts_Technology$BHAR12mnd)
median_vc_bhar12mts_Technology <- median(vc_12mts_Technology$BHAR12mnd)
head(willcox_vc_bhar12mts_Technology)
head(median_vc_bhar12mts_Technology)
willcox_vc_bhar24mts_Technology <-
wilcox.test(vc_24mts_Technology$BHAR24mnd)
median_vc_bhar24mts_Technology <- median(vc_24mts_Technology$BHAR24mnd)
head(willcox_vc_bhar24mts_Technology)
head(median_vc_bhar24mts_Technology)
willcox_vc_bhar36mts_Technology <-
wilcox.test(vc_36mts_Technology$BHAR36mnd)
median_vc_bhar36mts_Technology <- median(vc_36mts_Technology$BHAR36mnd)
head(willcox_vc_bhar36mts_Technology)
head(median_vc_bhar36mts_Technology)

willcox_vc_bhar12mts_Energy <- wilcox.test(vc_12mts_Energy$BHAR12mnd)
median_vc_bhar12mts_Energy <- median(vc_12mts_Energy$BHAR12mnd)
head(willcox_vc_bhar12mts_Energy)
head(median_vc_bhar12mts_Energy)
willcox_vc_bhar24mts_Energy <- wilcox.test(vc_24mts_Energy$BHAR24mnd)
median_vc_bhar24mts_Energy <- median(vc_24mts_Energy$BHAR24mnd)
head(willcox_vc_bhar24mts_Energy)
head(median_vc_bhar24mts_Energy)
willcox_vc_bhar36mts_Energy <- wilcox.test(vc_36mts_Energy$BHAR36mnd)
median_vc_bhar36mts_Energy <- median(vc_36mts_Energy$BHAR36mnd)
head(willcox_vc_bhar36mts_Energy)
head(median_vc_bhar36mts_Energy)

```

```

willcox_vc_bhar12mts_Industrial <-
wilcox.test(vc_12mts_Industrial$BHAR12mnd)
median_vc_bhar12mts_Industrial <- median(vc_12mts_Industrial$BHAR12mnd)
head(willcox_vc_bhar12mts_Industrial)
head(median_vc_bhar12mts_Industrial)
willcox_vc_bhar24mts_Industrial <-
wilcox.test(vc_24mts_Industrial$BHAR24mnd)
median_vc_bhar24mts_Industrial <- median(vc_24mts_Industrial$BHAR24mnd)
head(willcox_vc_bhar24mts_Industrial)
head(median_vc_bhar24mts_Industrial)
willcox_vc_bhar36mts_Industrial <-
wilcox.test(vc_36mts_Industrial$BHAR36mnd)
median_vc_bhar36mts_Industrial <- median(vc_36mts_Industrial$BHAR36mnd)
head(willcox_vc_bhar36mts_Industrial)
head(median_vc_bhar36mts_Industrial)

willcox_vc_bhar12mts_Utillities <- wilcox.test(vc_12mts_Utillities$BHAR12mnd)
median_vc_bhar12mts_Utillities <- median(vc_12mts_Utillities$BHAR12mnd)
head(willcox_vc_bhar12mts_Utillities)
head(median_vc_bhar12mts_Utillities)
willcox_vc_bhar24mts_Utillities <- wilcox.test(vc_24mts_Utillities$BHAR24mnd)
median_vc_bhar24mts_Utillities <- median(vc_24mts_Utillities$BHAR24mnd)
head(willcox_vc_bhar24mts_Utillities)
head(median_vc_bhar24mts_Utillities)
willcox_vc_bhar36mts_Utillities <- wilcox.test(vc_36mts_Utillities$BHAR36mnd)
median_vc_bhar36mts_Utillities <- median(vc_36mts_Utillities$BHAR36mnd)
head(willcox_vc_bhar36mts_Utillities)
head(median_vc_bhar36mts_Utillities)

willcox_vc_car12mts_basicmaterials <-
wilcox.test(vc_12mts_basicmaterials$CAR12mnd)
median_vc_car12mts_basicmaterials <-
median(vc_12mts_basicmaterials$CAR12mnd)
head(willcox_vc_car12mts_basicmaterials)
head(median_vc_car12mts_basicmaterials)
willcox_vc_car24mts_basicmaterials <-
wilcox.test(vc_24mts_basicmaterials$CAR24mnd)
median_vc_car24mts_basicmaterials <-
median(vc_24mts_basicmaterials$CAR24mnd)
head(willcox_vc_car24mts_basicmaterials)
head(median_vc_car24mts_basicmaterials)
willcox_vc_car36mts_basicmaterials <-
wilcox.test(vc_36mts_basicmaterials$CAR36mnd)
median_vc_car36mts_basicmaterials <-
median(vc_36mts_basicmaterials$CAR36mnd)
head(willcox_vc_car36mts_basicmaterials)
head(median_vc_car36mts_basicmaterials)

willcox_vc_car12mts_Communications <-
wilcox.test(vc_12mts_Communications$CAR12mnd)
median_vc_car12mts_Communications <-
median(vc_12mts_Communications$CAR12mnd)
head(willcox_vc_car12mts_Communications)
head(median_vc_car12mts_Communications)
willcox_vc_car24mts_Communications <-
wilcox.test(vc_24mts_Communications$CAR24mnd)

```

```
median_vc_car24mts_Communications <-
median(vc_24mts_Communications$CAR24mnd)
head(willcox_vc_car24mts_Communications)
head(median_vc_car24mts_Communications)
willcox_vc_car36mts_Communications <-
wilcox.test(vc_36mts_Communications$CAR36mnd)
median_vc_car36mts_Communications <-
median(vc_36mts_Communications$CAR36mnd)
head(willcox_vc_car36mts_Communications)
head(median_vc_car36mts_Communications)
```

```
willcox_vc_car12mts_ConsumerCyclical <-
wilcox.test(vc_12mts_ConsumerCyclical$CAR12mnd)
median_vc_car12mts_ConsumerCyclical <-
median(vc_12mts_ConsumerCyclical$CAR12mnd)
head(willcox_vc_car12mts_ConsumerCyclical)
head(median_vc_car12mts_ConsumerCyclical)
willcox_vc_car24mts_ConsumerCyclical <-
wilcox.test(vc_24mts_ConsumerCyclical$CAR24mnd)
median_vc_car24mts_ConsumerCyclical <-
median(vc_24mts_ConsumerCyclical$CAR24mnd)
head(willcox_vc_car24mts_ConsumerCyclical)
head(median_vc_car24mts_ConsumerCyclical)
willcox_vc_car36mts_ConsumerCyclical <-
wilcox.test(vc_36mts_ConsumerCyclical$CAR36mnd)
median_vc_car36mts_ConsumerCyclical <-
median(vc_36mts_ConsumerCyclical$CAR36mnd)
head(willcox_vc_car36mts_ConsumerCyclical)
head(median_vc_car36mts_ConsumerCyclical)
```

```
willcox_vc_car12mts_ConsumerNonCyclical <-
wilcox.test(vc_12mts_ConsumerNonCyclical$CAR12mnd)
median_vc_car12mts_ConsumerNonCyclical <-
median(vc_12mts_ConsumerNonCyclical$CAR12mnd)
head(willcox_vc_car12mts_ConsumerNonCyclical)
head(median_vc_car12mts_ConsumerNonCyclical)
willcox_vc_car24mts_ConsumerNonCyclical <-
wilcox.test(vc_24mts_ConsumerNonCyclical$CAR24mnd)
median_vc_car24mts_ConsumerNonCyclical <-
median(vc_24mts_ConsumerNonCyclical$CAR24mnd)
head(willcox_vc_car24mts_ConsumerNonCyclical)
head(median_vc_car24mts_ConsumerNonCyclical)
willcox_vc_car36mts_ConsumerNonCyclical <-
wilcox.test(vc_36mts_ConsumerNonCyclical$CAR36mnd)
median_vc_car36mts_ConsumerNonCyclical <-
median(vc_36mts_ConsumerNonCyclical$CAR36mnd)
head(willcox_vc_car36mts_ConsumerNonCyclical)
head(median_vc_car36mts_ConsumerNonCyclical)
```

```
willcox_vc_car12mts_Financial <- wilcox.test(vc_12mts_Financial$CAR12mnd)
median_vc_car12mts_Financial <- median(vc_12mts_Financial$CAR12mnd)
head(willcox_vc_car12mts_Financial)
head(median_vc_car12mts_Financial)
willcox_vc_car24mts_Financial <- wilcox.test(vc_24mts_Financial$CAR24mnd)
median_vc_car24mts_Financial <- median(vc_24mts_Financial$CAR24mnd)
head(willcox_vc_car24mts_Financial)
head(median_vc_car24mts_Financial)
```

```
willcox_vc_car36mts_Financial <- wilcox.test(vc_36mts_Financial$CAR36mnd)
median_vc_car36mts_Financial <- median(vc_36mts_Financial$CAR36mnd)
head(willcox_vc_car36mts_Financial)
head(median_vc_car36mts_Financial)

willcox_vc_car12mts_Technology <- wilcox.test(vc_12mts_Technology$CAR12mnd)
median_vc_car12mts_Technology <- median(vc_12mts_Technology$CAR12mnd)
head(willcox_vc_car12mts_Technology)
head(median_vc_car12mts_Technology)
willcox_vc_car24mts_Technology <- wilcox.test(vc_24mts_Technology$CAR24mnd)
median_vc_car24mts_Technology <- median(vc_24mts_Technology$CAR24mnd)
head(willcox_vc_car24mts_Technology)
head(median_vc_car24mts_Technology)
willcox_vc_car36mts_Technology <- wilcox.test(vc_36mts_Technology$CAR36mnd)
median_vc_car36mts_Technology <- median(vc_36mts_Technology$CAR36mnd)
head(willcox_vc_car36mts_Technology)
head(median_vc_car36mts_Technology)

willcox_vc_car12mts_Energy <- wilcox.test(vc_12mts_Energy$CAR12mnd)
median_vc_car12mts_Energy <- median(vc_12mts_Energy$CAR12mnd)
head(willcox_vc_car12mts_Energy)
head(median_vc_car12mts_Energy)
willcox_vc_car24mts_Energy <- wilcox.test(vc_24mts_Energy$CAR24mnd)
median_vc_car24mts_Energy <- median(vc_24mts_Energy$CAR24mnd)
head(willcox_vc_car24mts_Energy)
head(median_vc_car24mts_Energy)
willcox_vc_car36mts_Energy <- wilcox.test(vc_36mts_Energy$CAR36mnd)
median_vc_car36mts_Energy <- median(vc_36mts_Energy$CAR36mnd)
head(willcox_vc_car36mts_Energy)
head(median_vc_car36mts_Energy)

willcox_vc_car12mts_Industrial <- wilcox.test(vc_12mts_Industrial$CAR12mnd)
median_vc_car12mts_Industrial <- median(vc_12mts_Industrial$CAR12mnd)
head(willcox_vc_car12mts_Industrial)
head(median_vc_car12mts_Industrial)
willcox_vc_car24mts_Industrial <- wilcox.test(vc_24mts_Industrial$CAR24mnd)
median_vc_car24mts_Industrial <- median(vc_24mts_Industrial$CAR24mnd)
head(willcox_vc_car24mts_Industrial)
head(median_vc_car24mts_Industrial)
willcox_vc_car36mts_Industrial <- wilcox.test(vc_36mts_Industrial$CAR36mnd)
median_vc_car36mts_Industrial <- median(vc_36mts_Industrial$CAR36mnd)
head(willcox_vc_car36mts_Industrial)
head(median_vc_car36mts_Industrial)

willcox_vc_car12mts_Utillities <- wilcox.test(vc_12mts_Utillities$CAR12mnd)
median_vc_car12mts_Utillities <- median(vc_12mts_Utillities$CAR12mnd)
head(willcox_vc_car12mts_Utillities)
head(median_vc_car12mts_Utillities)
willcox_vc_car24mts_Utillities <- wilcox.test(vc_24mts_Utillities$CAR24mnd)
median_vc_car24mts_Utillities <- median(vc_24mts_Utillities$CAR24mnd)
head(willcox_vc_car24mts_Utillities)
head(median_vc_car24mts_Utillities)
willcox_vc_car36mts_Utillities <- wilcox.test(vc_36mts_Utillities$CAR36mnd)
median_vc_car36mts_Utillities <- median(vc_36mts_Utillities$CAR36mnd)
head(willcox_vc_car36mts_Utillities)
head(median_vc_car36mts_Utillities)
```



```
##### RUNNING A REGRESSION ON PERFORMANCE #####
```

```
returndata12mts <- dummy_cols(returndata12mts, select_columns =  
c("Definition", "Country", "MarketActivity", "Industry"))  
returndata24mts <- dummy_cols(returndata24mts, select_columns =  
c("Definition", "Country", "MarketActivity", "Industry"))  
returndata36mts <- dummy_cols(returndata36mts, select_columns =  
c("Definition", "Country", "MarketActivity", "Industry"))
```

```
# Regression on 12months bhar as Y variable excluding industry dummy
```

```
perf1_12mts_bhar <- lm(returndata12mts$BHAR12mnd ~  
    returndata12mts$Definition_PE +  
    returndata12mts$Definition_VC +  
    returndata12mts$MarketActivity_Hot +  
    returndata12mts$OfferTo1stClose +  
    returndata12mts$McapAtOffer +  
    returndata12mts$EquitySold)
```

```
summary(perf1_12mts_bhar)
```

```
perf1_12mts_bhar <- white_test(perf1_12mts_bhar)
```

```
head(perf1_12mts_bhar)
```

```
white_perf1_12mts_bhar <- white_test(perf1_12mts_bhar)
```

```
head(perf1_12mts_bhar)
```

```
# Regression on 24months bhar as y variable excluding industry dummy
```

```
perf1_24mts_bhar <- lm(returndata24mts$BHAR24mnd ~  
    returndata24mts$Definition_PE +  
    returndata24mts$Definition_VC +  
    returndata24mts$MarketActivity_Hot +  
    returndata24mts$OfferTo1stClose +  
    returndata24mts$McapAtOffer +  
    returndata24mts$EquitySold)
```

```
summary(perf1_24mts_bhar)
```

```
perf1_24mts_bhar <- white_test(perf1_24mts_bhar)
```

```
head(perf1_24mts_bhar)
```

```
white_perf1_24mts_bhar <- white_test(perf1_24mts_bhar)
```

```
head(perf1_24mts_bhar)
```

```
# Regression on 36months bhar as y variable excluding industry dummy
```

```
perf1_36mts_bhar <- lm(returndata36mts$BHAR36mnd ~  
    returndata36mts$Definition_PE +  
    returndata36mts$Definition_VC +  
    returndata36mts$MarketActivity_Hot +  
    returndata36mts$OfferTo1stClose +  
    returndata36mts$McapAtOffer +  
    returndata36mts$EquitySold)
```

```
summary(perf1_36mts_bhar)
```

```
perf1_36mts_bhar <- white_test(perf1_36mts_bhar)
```

```
head(perf1_36mts_bhar)
```

```
white_perf1_36mts_bhar <- white_test(perf1_36mts_bhar)
```

```
head(perf1_36mts_bhar)
```

```
# Regression on 12months bhar as y variable including industry dummy
```

```
perf2_12mts_bhar <- lm(returndata12mts$BHAR12mnd ~  
    returndata12mts$Definition_PE +  
    returndata12mts$Definition_VC +  
    returndata12mts$MarketActivity_Hot +
```

```

        returndata12mts$OfferTo1stClose +
        returndata12mts$McapAtOffer +
        returndata12mts$EquitySold +
        returndata12mts$Industry_Technology +
        returndata12mts$Industry_Communications)
summary(perf2_12mts_bhar)
perf2_12mts_bhar <- white_test(perf2_12mts_bhar)
head(perf2_12mts_bhar)
white_perf2_12mts_bhar <- white_test(perf2_12mts_bhar)
head(perf2_12mts_bhar)

# Regression on 24months bhar as y variable including industry dummy
perf2_24mts_bhar <- lm(returndata24mts$BHAR24mnd ~
        returndata24mts$Definition_PE +
        returndata24mts$Definition_VC +
        returndata24mts$MarketActivity_Hot +
        returndata24mts$OfferTo1stClose +
        returndata24mts$McapAtOffer +
        returndata24mts$EquitySold +
        returndata24mts$Industry_Technology +
        returndata24mts$Industry_ConsumerCyclical)
summary(perf2_24mts_bhar)
perf2_24mts_bhar <- white_test(perf2_24mts_bhar)
head(perf2_24mts_bhar)
white_perf2_24mts_bhar <- white_test(perf2_24mts_bhar)
head(perf2_24mts_bhar)

# Regression on 36months bhar as y variable including industry dummy
perf2_36mts_bhar <- lm(returndata36mts$BHAR36mnd ~
        returndata36mts$Definition_PE +
        returndata36mts$Definition_VC +
        returndata36mts$MarketActivity_Hot +
        returndata36mts$OfferTo1stClose +
        returndata36mts$McapAtOffer +
        returndata36mts$EquitySold +
        returndata36mts$Industry_Technology +
        returndata36mts$Industry_ConsumerCyclical)

summary(perf2_36mts_bhar)
perf2_36mts_bhar <- white_test(perf2_36mts_bhar)
head(perf2_36mts_bhar)
white_perf2_36mts_bhar <- white_test(perf2_36mts_bhar)
head(perf2_36mts_bhar)

# Regression on 12months CAR as Y variable excluding industry dummy
perf1_12mts_car <- lm(returndata12mts$CAR12mnd ~
        returndata12mts$Definition_PE +
        returndata12mts$Definition_VC +
        returndata12mts$MarketActivity_Hot +
        returndata12mts$OfferTo1stClose +
        returndata12mts$McapAtOffer +
        returndata12mts$EquitySold)
summary(perf1_12mts_car)
perf1_12mts_car <- white_test(perf1_12mts_car)
head(perf1_12mts_car)
white_perf1_12mts_car <- white_test(perf1_12mts_car)
head(perf1_12mts_car)

```

```

# Regression on 24months car as y variable excluding industry dummy
perf1_24mts_car <- lm( returndata24mts$CAR24mnd ~
                      returndata24mts$Definition_PE +
                      returndata24mts$Definition_VC +
                      returndata24mts$MarketActivity_Hot +
                      returndata24mts$OfferTo1stClose +
                      returndata24mts$McapAtOffer +
                      returndata24mts$EquitySold)

summary(perf1_24mts_car)
perf1_24mts_car <- white_test(perf1_24mts_car)
head(perf1_24mts_car)
white_perf1_24mts_car <- white_test(perf1_24mts_car)
head(perf1_24mts_car)

# Regression on 36months car as y variable excluding industry dummy
perf1_36mts_car <- lm( returndata36mts$CAR36mnd ~
                      returndata36mts$Definition_PE +
                      returndata36mts$Definition_VC +
                      returndata36mts$MarketActivity_Hot +
                      returndata36mts$OfferTo1stClose +
                      returndata36mts$McapAtOffer +
                      returndata36mts$EquitySold)

summary(perf1_36mts_car)
perf1_36mts_car <- white_test(perf1_36mts_car)
head(perf1_36mts_car)
white_perf1_36mts_car <- white_test(perf1_36mts_car)
head(perf1_36mts_car)

# Regression on 12months CAR as Y variable including industry dummy
perf2_12mts_car <- lm( returndata12mts$CAR12mnd ~
                      returndata12mts$Definition_PE +
                      returndata12mts$Definition_VC +
                      returndata12mts$MarketActivity_Hot +
                      returndata12mts$OfferTo1stClose +
                      returndata12mts$McapAtOffer +
                      returndata12mts$EquitySold +
                      returndata12mts$Industry_Technology +
                      returndata12mts$Industry_Communications)

summary(perf2_12mts_car)
perf2_12mts_car <- white_test(perf2_12mts_car)
head(perf2_12mts_car)
white_perf2_12mts_car <- white_test(perf2_12mts_car)
head(perf2_12mts_car)

# Regression on 24months CAR as y variable including industry dummy
perf2_24mts_car <- lm( returndata24mts$CAR24mnd ~
                      returndata24mts$Definition_PE +
                      returndata24mts$Definition_VC +
                      returndata24mts$MarketActivity_Hot +
                      returndata24mts$OfferTo1stClose +
                      returndata24mts$McapAtOffer +
                      returndata24mts$EquitySold +
                      returndata24mts$Industry_Technology +
                      returndata24mts$Industry_Communications)

summary(perf2_24mts_car)

```

```
perf2_24mts_car <- white_test(perf2_24mts_car)
head(perf2_24mts_car)
white_perf2_24mts_car <- white_test(perf2_24mts_car)
head(perf2_24mts_car)

# Regression on 36months CAR as y variable cluding industry dummy
perf2_36mts_car <- lm( returndata36mts$CAR36mnd ~
                      returndata36mts$Definition_PE +
                      returndata36mts$Definition_VC +
                      returndata36mts$MarketActivity_Hot +
                      returndata36mts$OfferTo1stClose +
                      returndata36mts$McapAtOffer +
                      returndata36mts$EquitySold +
                      returndata36mts$Industry_Technology +
                      returndata36mts$Industry_Communications)

summary(perf2_36mts_car)
perf2_36mts_car <- white_test(perf2_36mts_car)
head(perf2_36mts_car)
white_perf2_36mts_car <- white_test(perf2_36mts_car)
head(perf2_36mts_car)

##### END #####

pdf(file = "Code_PDF")
dev.off()
```