#download data from tsetmc site: bank\_pasargad

choose.files()

File<- c("E:\\daneshgah\\time series\\پروژه دوم\\S\_Pasargad Bank.csv")

data1 <- read.table(file = File, header = TRUE)

print(head(data1))

#split data

split\_data <- strsplit(as.character(data1[,1]), ",")

# convert list to data frame

data\_split <- do.call(rbind, split\_data)

data\_clean <- as.data.frame(data\_split)

colnames(data\_clean) <- c("Date", "First", "High", "Low", "Close")

print(head(data\_clean))

# converts the "Date" column in data\_clean from a character format to a date format

dates <- as.character(data\_clean[, "Date"])

dates <- as.Date(dates, "%Y%m%d")

data\_clean[, "Date"] <- dates

#convert to time series

x<-ts(data\_clean,start=2013, frequency=12, end=2024)

#make tsprice

Price <- data\_clean[,"Close"]

Price

TSPrice <-ts ( Price , frequency = 12,start = c(2013,1))

#plot TSPrice

plot.ts(TSPrice , xlab= "Time", ylab ="Price Time Series of The S\_Pasargad Bank")

#make Tsreturn

Return <- c(NA, log(Price[-1] / Price[-length(Price)]))

TSReturn <- ts(Return[-1], frequency = 12, start = c(2013, 11))

#plot Tsreturn

plot(TSReturn,ylab="Return Time Series of The S\_Pasargad Bank")

StockTejarat\_Bank<-scan(file,skip=1)

#descriptive return

basicStats(return)

#plot

plot.ts(StockTejarat\_Bank$residuals)

#fBasics packages

install.packages("fBasics")

library(fBasics)

choose.files()

file<- c("E:\\daneshgah\\time series\\data\\Tejarat Bank.txt")

StockTejarat\_Bank<-scan(file,skip=1)

return<-log(StockTejarat\_Bank[-1] / StockTejarat\_Bank[-NROW(StockTejarat\_Bank)])\*100

Return

basicStats(return)

#check normality

normalTest(return,method="jb")

#skewness test

s1 <- sqrt(var(return))

t1 <- s1 / sqrt(6 / length(return))

t1

#kurtusis test

s4<- var(return)^2

t4<-s4/sqrt(24/length(return))

t4

pv=2\*(1-pnorm(t4))

pv

#acf

acf(return,lag.max =10)

autocorrelations<-acf$acf[-1]

lags<-1:10

acf\_table<- data.frame(lag=lags , autocorrelations=round(autocorrelations,3))

#Box.test

Box.test(return,lag=10)

Box.test(return $residuals,lag=10)

# installed.packages forecast

installed.packages("forecast")

installed.packages("forecast",dependencies=TRUE)

sessionInfo()

packageDescription("forecast")

packageDescription("timeDate")

installed.packages("broom" , type="binary")

installed.packages("Rcpp")

library('forecast')

boxplot(StockTejarat\_Bank)

#forecast

bank\_pasargadforecasts <- HoltWinters(x, beta=FALSE, gamma=FALSE)

bank\_pasargadforecasts

bank\_pasargadforecasts$fitted

bank\_pasargadforecasts$SSE

plot(bank\_pasargadforecasts,xlim=c(2013,2023),ylim = c(0,20000))

plot.ts(bank\_pasargadforecasts)

bank\_pasargad\_forecast2 <- forecast(bank\_pasargadforecasts, h = 10)

bank\_pasargad\_forecast2

plot.forecast(bank\_pasargad\_forecast2)

forecast.HoltWinter()

acf(bank\_pasargad\_forecast2$ residuals,lag.max=20)