Minitest1_Krittaphong.R

kritt

2021-02-11

```
#Krittaphong Kaewvichian ID 6104640609
setwd("C:/Users/kritt/Desktop/EE435-R")
cat(rep("\n",50))  #clear R Console
```

```
#install.packages("tinytex")
#install.packages("quantmod")
#install.packages("fBasics")
#install.packages("sn")
#install.packages("PerformanceAnalytics")
#install.packages("car")
#install.packages("tseries")
#install.packages("forecast")
library(quantmod)
```

```
## Loading required package: xts

## Loading required package: zoo

##
## Attaching package: 'zoo'

## The following objects are masked from 'package:base':
##
##     as.Date, as.Date.numeric

## Loading required package: TTR

## Registered S3 method overwritten by 'quantmod':
##   method            from
##   as.zoo.data.frame zoo
```

```
library(fBasics)
```

```
## Loading required package: timeDate

## Loading required package: timeSeries

##
## Attaching package: 'timeSeries'
```

```
## The following object is masked from 'package:zoo':
##
##     time<-

##
## Attaching package: 'fBasics'

## The following object is masked from 'package:TTR':
##
##     volatility
```

```
library(sn)
```

```
## Loading required package: stats4

##
## Attaching package: 'sn'

## The following object is masked from 'package:fBasics':
##
##     vech

## The following object is masked from 'package:stats':
##
##     sd
```

```
library(PerformanceAnalytics)
```

```
##
## Attaching package: 'PerformanceAnalytics'

## The following objects are masked from 'package:timeDate':
##
##     kurtosis, skewness

## The following object is masked from 'package:graphics':
##
##     legend
```

```
library(car)
```

```
## Loading required package: carData

##
## Attaching package: 'car'

## The following object is masked from 'package:fBasics':
##
##     densityPlot
```

```r
library(tseries)
library(forecast)

#GOOG
getSymbols("GOOG",from="2004-08-19",to="2021-01-01")
```

```
## 'getSymbols' currently uses auto.assign=TRUE by default, but will
## use auto.assign=FALSE in 0.5-0. You will still be able to use
## 'loadSymbols' to automatically load data. getOption("getSymbols.env")
## and getOption("getSymbols.auto.assign") will still be checked for
## alternate defaults.
##
## This message is shown once per session and may be disabled by setting
## options("getSymbols.warning4.0"=FALSE). See ?getSymbols for details.
```

```
## [1] "GOOG"
```

```r
dim(GOOG)
```

```
## [1] 4122    6
```

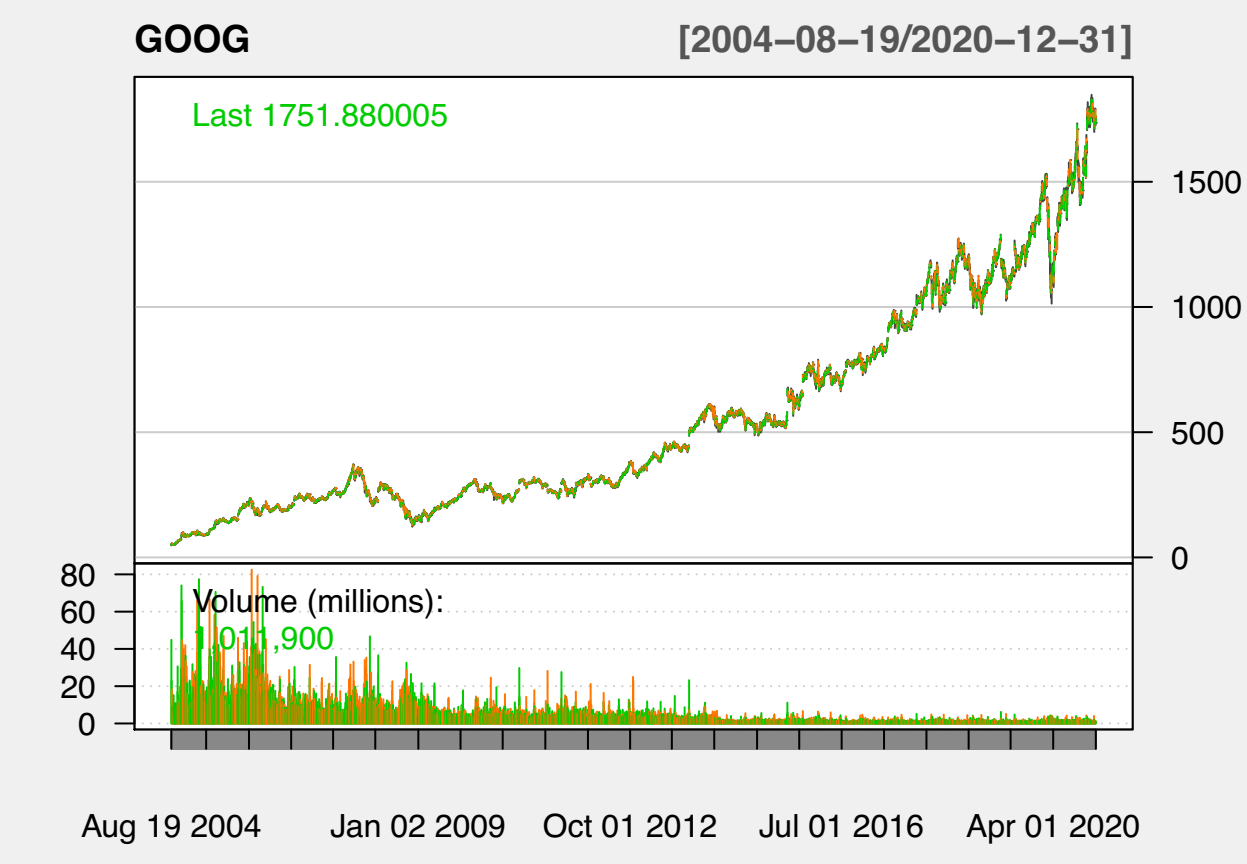
```r
head(GOOG)
```

```
##            GOOG.Open GOOG.High GOOG.Low GOOG.Close GOOG.Volume GOOG.Adjusted
## 2004-08-19  49.81329  51.83571 47.80083   49.98266    44871361      49.98266
## 2004-08-20  50.31640  54.33633 50.06235   53.95277    22942874      53.95277
## 2004-08-23  55.16822  56.52812 54.32139   54.49574    18342897      54.49574
## 2004-08-24  55.41230  55.59163 51.59162   52.23920    15319808      52.23920
## 2004-08-25  52.28403  53.79835 51.74604   52.80209     9232276      52.80209
## 2004-08-26  52.27905  53.77345 52.13459   53.75352     7128620      53.75352
```

```r
tail(GOOG)
```

```
##            GOOG.Open GOOG.High GOOG.Low GOOG.Close GOOG.Volume GOOG.Adjusted
## 2020-12-23  1728.110  1747.990 1725.040    1732.38     1033800       1732.38
## 2020-12-24  1735.000  1746.000 1729.110    1738.85      346800       1738.85
## 2020-12-28  1751.635  1790.728 1746.335    1776.09     1393000       1776.09
## 2020-12-29  1787.790  1792.440 1756.090    1758.72     1299400       1758.72
## 2020-12-30  1762.010  1765.095 1725.600    1739.52     1306100       1739.52
## 2020-12-31  1735.420  1758.930 1735.420    1751.88     1011900       1751.88
```

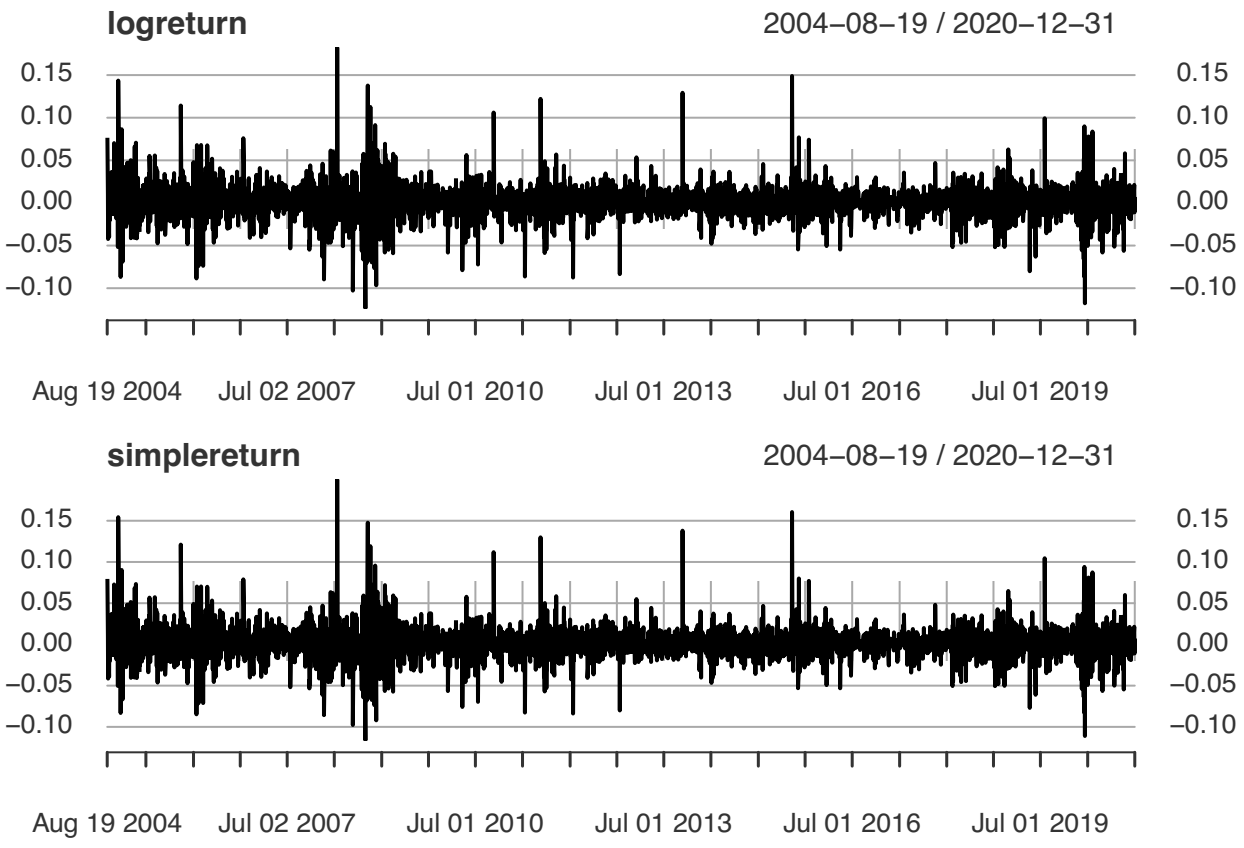
```r
da=GOOG
chartSeries(GOOG,theme="white")
```




```
price=da[,6]
plot(price,type='l')
```


```
logprice=log(price)
plot(logprice,type='l')
```

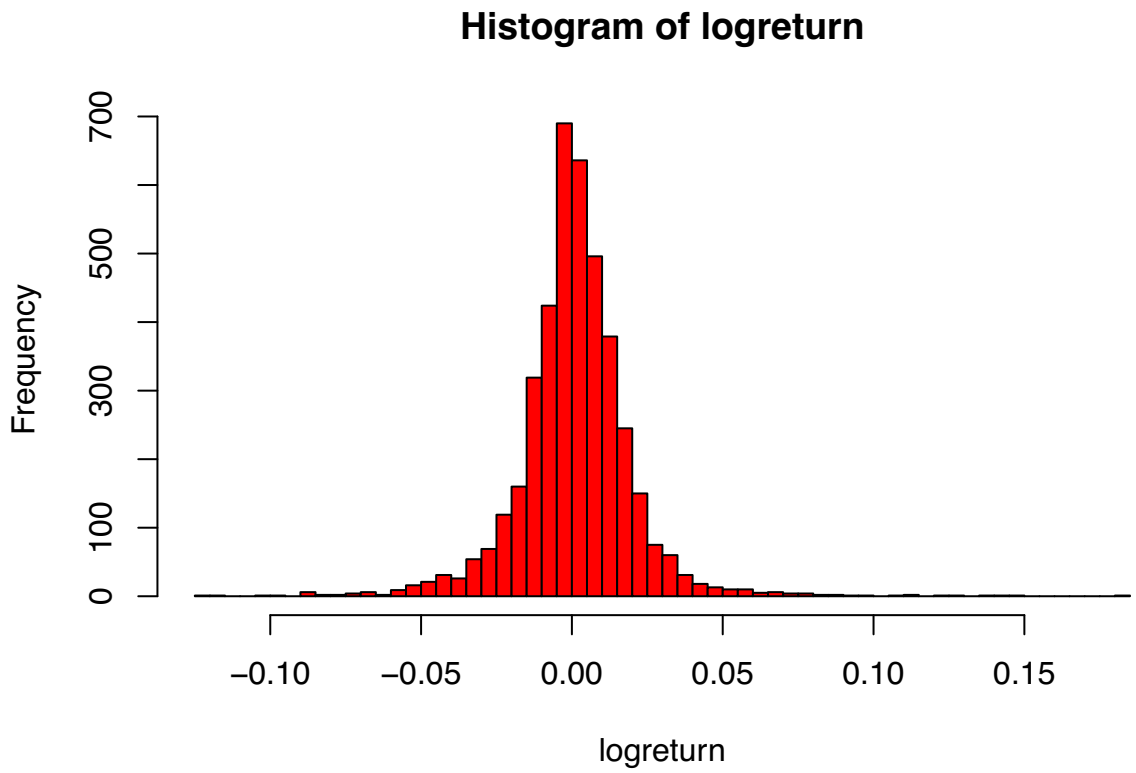

```
logreturn=diff(log(price))
simplereturn <-exp(logreturn)-1

#a [GOOG] Plot the series of log return and simple return of CAT
par(mfrow=c(2,1))
plot(logreturn,type='l')
plot(simplereturn)
```



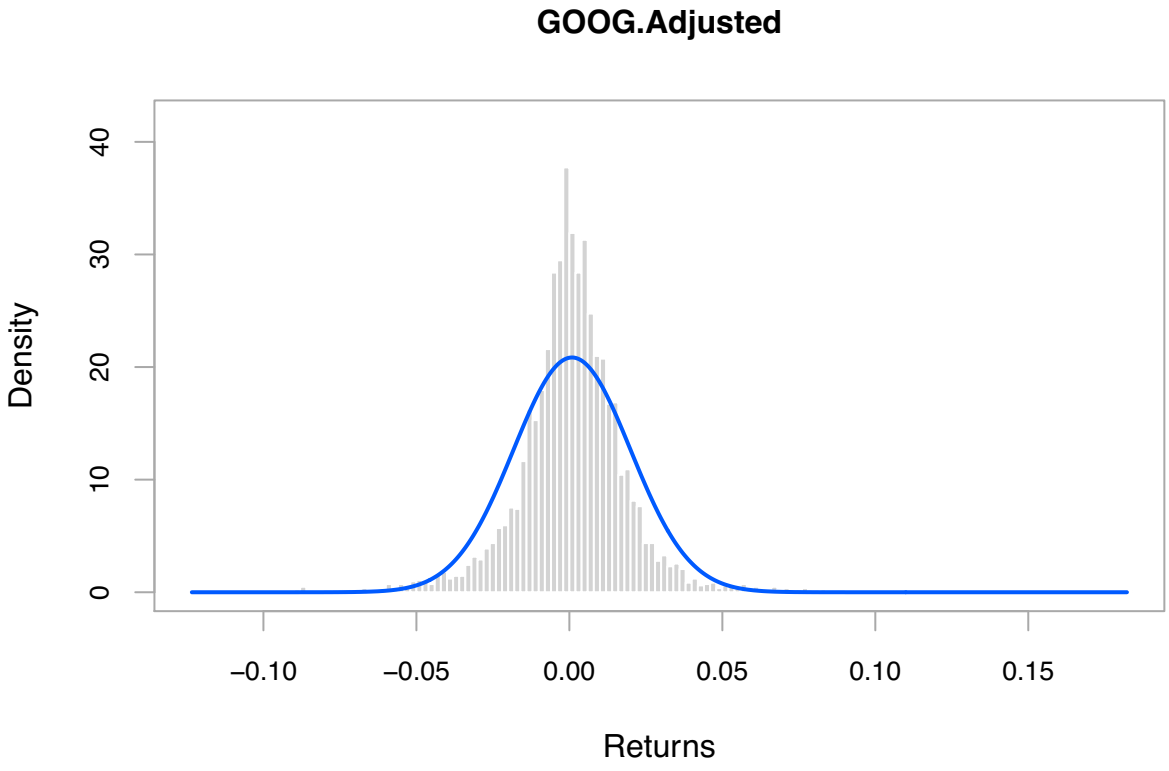

```
newlogreturn <- logreturn[2:nrow(logreturn),]
newsimplereturn <- simplereturn[2:nrow(logreturn),]

#b CAT (simple return) sample statistics
table.Stats(simplereturn)
```

```
##                 GOOG.Adjusted
## Observations        4121.0000
## NAs                    1.0000
## Minimum               -0.1161
## Quartile 1            -0.0074
## Median                 0.0007
## Arithmetic Mean        0.0010
## Geometric Mean         0.0009
## Quartile 3             0.0100
## Maximum                0.1999
## SE Mean                0.0003
## LCL Mean (0.95)        0.0005
## UCL Mean (0.95)        0.0016
## Variance               0.0004
## Stdev                  0.0193
## Skewness               0.7787
## Kurtosis              10.6495
```

```r
#c GOOG Simple EDF & Tests for normality
par(mfrow=c(1,1))
hist(logreturn, breaks=100, col="red")
```




```r
chart.Histogram(newlogreturn,methods = c("add.normal"))
```




```
jarque.bera.test(newlogreturn)
```

H_0: $R_{t_{6000}}$ is normal
H_a: $R_{t_{6000}}$ is not normal | JB-test

```
##
##  Jarque Bera Test
##
## data:  newlogreturn
## X-squared = 14482, df = 2, p-value < 2.2e-16
```

Ans Since, the p-value falls into the rejection region at 0.05 level of confidence. We reject H_0. That is, $R_{t_{6000}}$ is not normal.

```
#d&e GOOG (logreturn) sample statistics & (95% CI)
t.test(newlogreturn,mu=0.08)
```

```
## Warning in tstat + c(-cint, cint): Recycling array of length 1 in array-vector arithmetic is deprecat
##   Use c() or as.vector() instead.

## Warning in cint * stderr: Recycling array of length 1 in vector-array arithmetic is deprecated.
##   Use c() or as.vector() instead.

##
##  One Sample t-test
##
## data:  newlogreturn
## t = -265.51, df = 4120, p-value < 2.2e-16
## alternative hypothesis: true mean is not equal to 0.08
## 95 percent confidence interval:
```

$H_0: \mu_r = 0.08$ | t-test
$H_a: \mu_r \neq 0$

Since, the p-value falls into the rejection region at 0.05 level of confidence. That is, $\mu_r = 0.08$

```
## 0.0002787253 0.0014474425
## sample estimates:
##    mean of x
## 0.0008630839
```

95% CI

```
#f Test the skewness of the return ()
#GOOG
T=length(newlogreturn)
s3=skewness(newlogreturn)
tst = s3/sqrt(6/T)
tst
```

Note that $S_3 = m_3$

$H_0: m_3 = 0$

$H_a: m_3 \neq 0$

since, the p-value does not fall into the reject region at 0.05 level of confidence. That is, $m_3 = 0$.

The logreturnAOT is symmetric.

```
## [1] 11.8664
```

```
pv = 2*pnorm(tst)
pv
```

```
## [1] 2
```

```
#i Test the kurtosis (Excess Kurtosis = 0)
#GOOG
k4 = kurtosis(newlogreturn)
tst = k4/sqrt(24/T)
tst
```

$H_0: K_4 = 0$

$H_a: K_4 \neq 0$

since, the p-value falls into the rejection region at 0.05 level of confidence. That is, $K_4 \neq 0$.

The excess kurtosis of r_t is not 0

```
## [1] 119.7564
```

```
pv = 2*(1-pnorm(tst))
pv
```

```
## [1] 0
```