Stock Returns Analysis

2023-07-01

```
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('car')
```

```
## Loading required package: carData
```

```
library('tidyverse')
```

```
## -- Attaching core tidyverse packages ------------------------ tidyverse 2.0.0 --
## v dplyr     1.1.0     v readr     2.1.4
## v forcats   1.0.0     v stringr   1.5.0
## v ggplot2   3.4.2     v tibble    3.2.1
## v lubridate 1.9.2     v tidyr     1.3.0
## v purrr     1.0.1
```

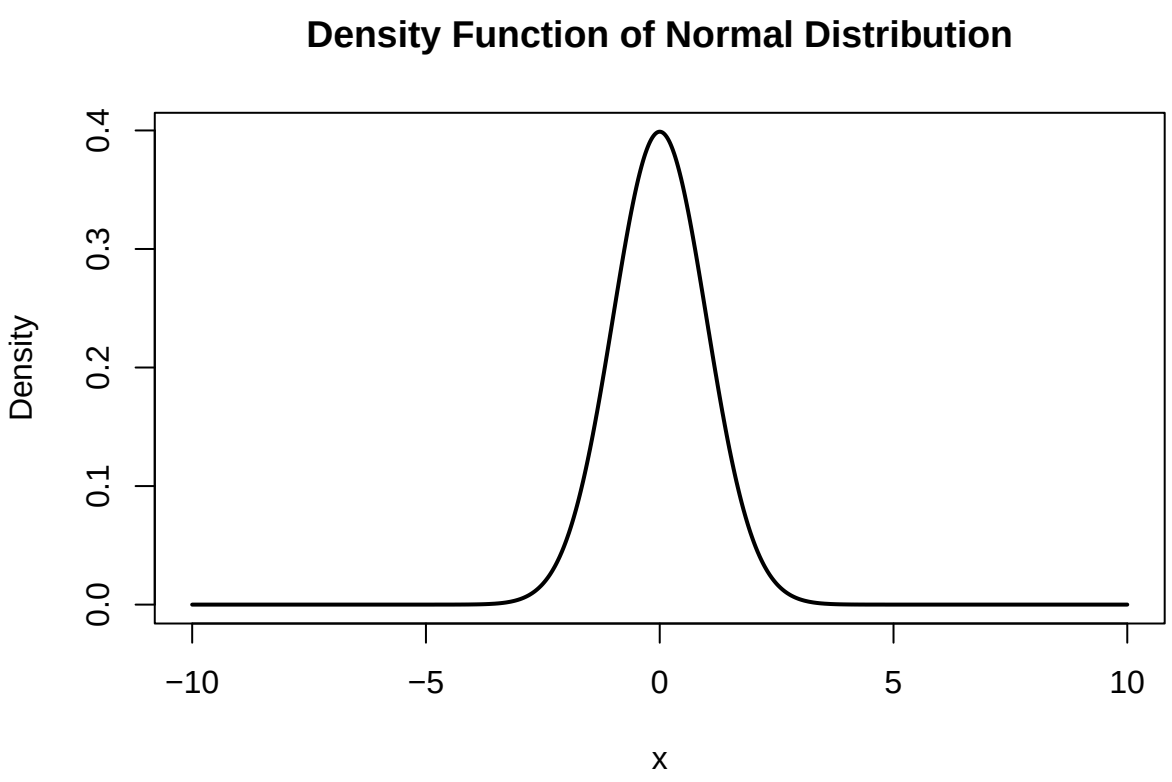
```
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::first()  masks xts::first()
## x dplyr::lag()    masks stats::lag()
## x dplyr::last()   masks xts::last()
## x dplyr::recode() masks car::recode()
## x purrr::some()   masks car::some()
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
```

```r
library('MASS')
```

```
##
## Attaching package: 'MASS'
##
## The following object is masked from 'package:dplyr':
##
##     select
```

```r
library('moments')
library('ggpubr')
```

```r
# Generate a sequence of x values
x <- seq(-10, 10, by = 0.01)

# Compute the density values for the normal distribution
density <- dnorm(x, mean = 0, sd = 1)
plot(x, density, type = "l", lwd = 2, xlab = "x", ylab = "Density",
     main = "Density Function of Normal Distribution")
```




```r
data <- data.frame(x = x, density = density)

kurt <- kurtosis(data$x)
skew <- skewness(data$x)

print(paste("Kurtosis:", kurt))
```

```
## [1] "Kurtosis: 1.7999994005994"
```

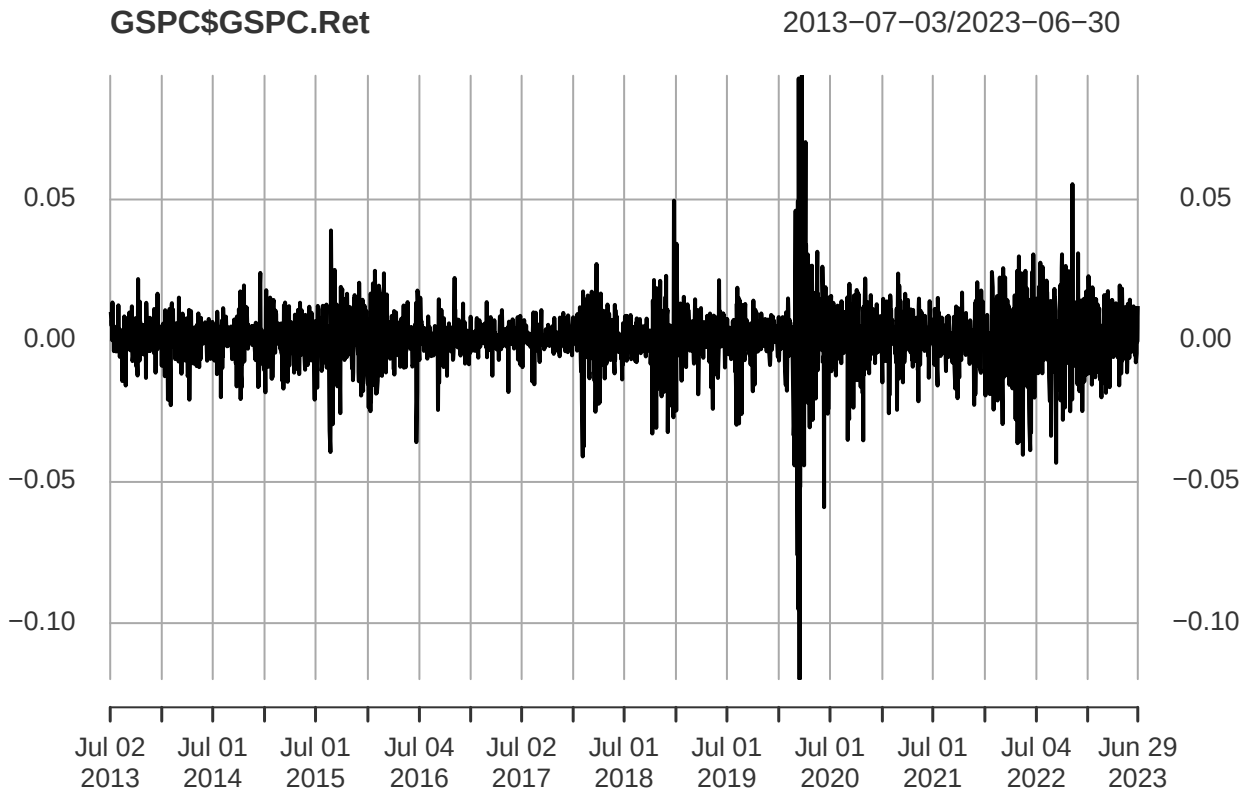
```
print(paste("Skewness:", skew))
```

```
## [1] "Skewness: -2.92713742323921e-16"
```

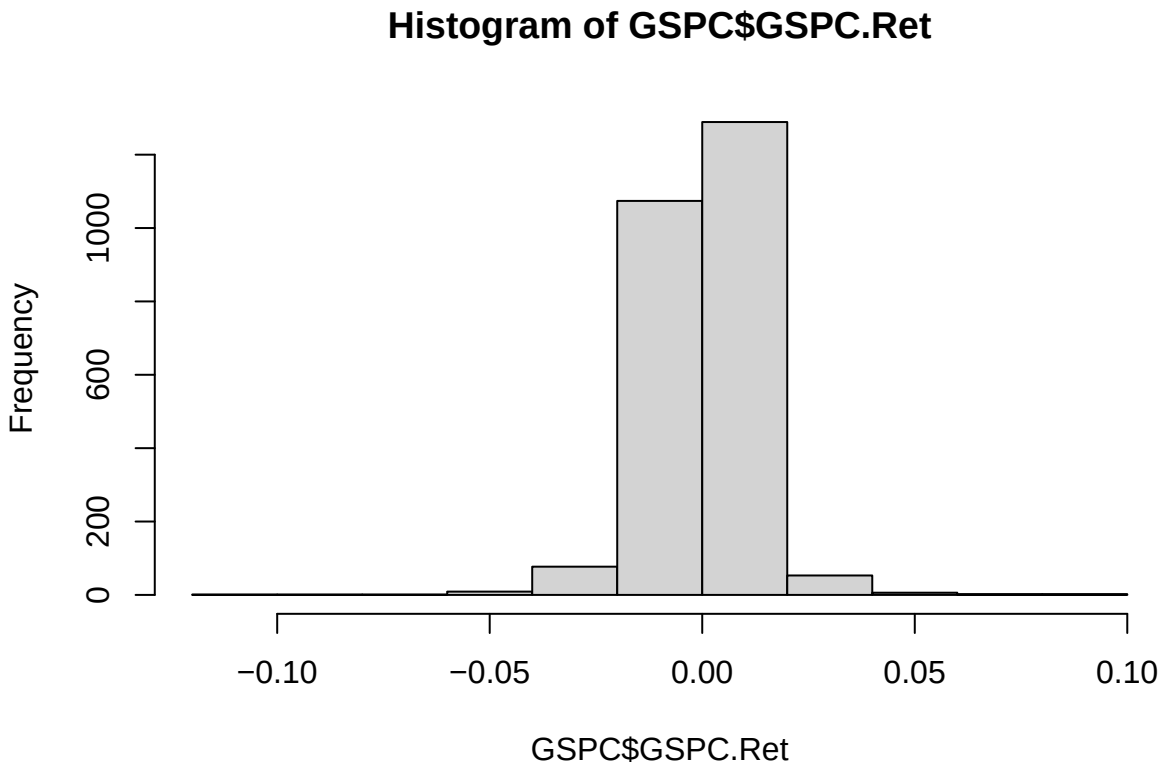
```
getSymbols("^GSPC",src='yahoo',from=Sys.Date()-3650,
           to=Sys.Date())
```

```
## [1] "GSPC"
```

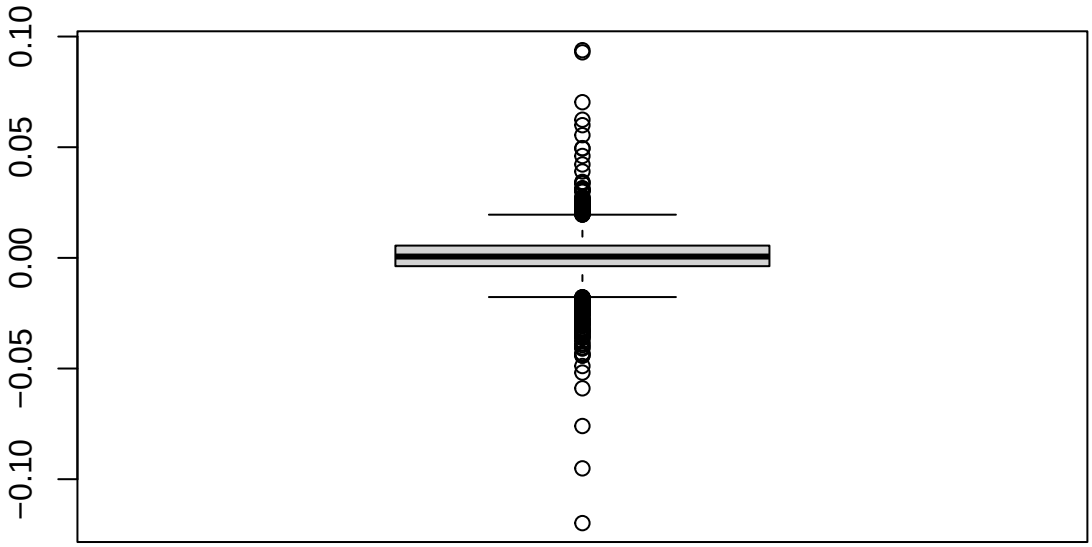
```
GSPC <- na.omit(GSPC)
GSPC$GSPC.Ret = diff(GSPC$GSPC.Adjusted)/lag(GSPC$GSPC.Adjusted)
plot(GSPC$GSPC.Ret)
```




```
hist(GSPC$GSPC.Ret)
```

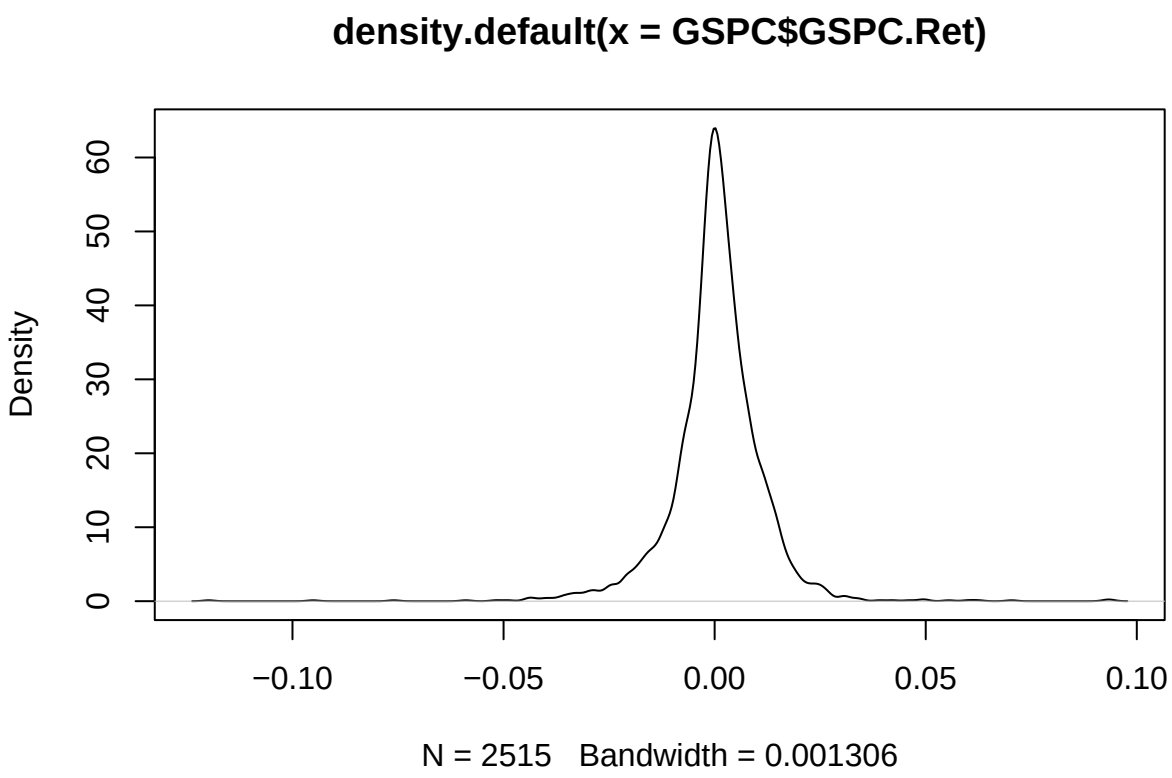



```r
boxplot(GSPC$GSPC.Ret)
```




```r
mean_GSPC <- mean(GSPC$GSPC.Ret)
sd_GSPC <- sd(GSPC$GSPC.Ret)

#x <- seq(min(GSPC$GSPC.Ret), max(GSPC$GSPC.Ret), length = 100)
#y <- dnorm(x, mean = mean_data, sd = sd_data)
#lines(x, y, col = "red", lwd = 2)
```

```r
#qplot(returns,data='GSPC$GSPC.Ret')
GSPC <- na.omit(GSPC)
d <- density(GSPC$GSPC.Ret)
plot(d)
```



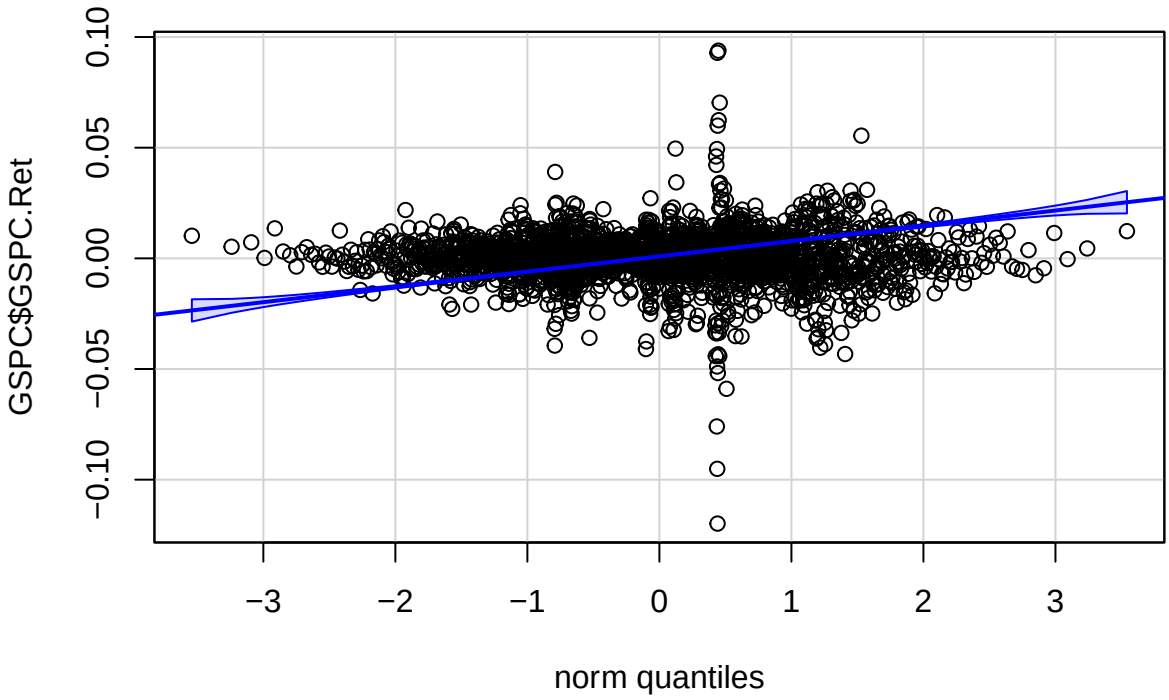

```r
fit <- fitdistr(GSPC$GSPC.Ret, densfun = "normal")

estimated_mean <- fit$estimate[1]
estimated_sd <- fit$estimate[2]

# Calculate the kurtosis and skewness
kurt <- kurtosis(GSPC$GSPC.Ret)
skew <- skewness(GSPC$GSPC.Ret)

# Print the kurtosis and skewness values
print(paste("Kurtosis:", kurt))
```

```
## [1] "Kurtosis: 18.0730787602652"
```

```r
print(paste("Skewness:", skew))
```

```
## [1] "Skewness: -0.528116064500579"
```

```r
qqPlot(GSPC$GSPC.Ret)
```




```
## GSPC.Ret
##     1686
```