jc_fintual

@patora

12-04-2022

Carga librerias

```
if (!require("alphavantager")) install.packages("alphavantager")
library(alphavantager)
library(tidyverse)
library(quantmod)
library(PerformanceAnalytics)
library(zoo)
library(ggplot2)
```

Carga Datos desde Alpha Vantage API usando paquete alphavantager

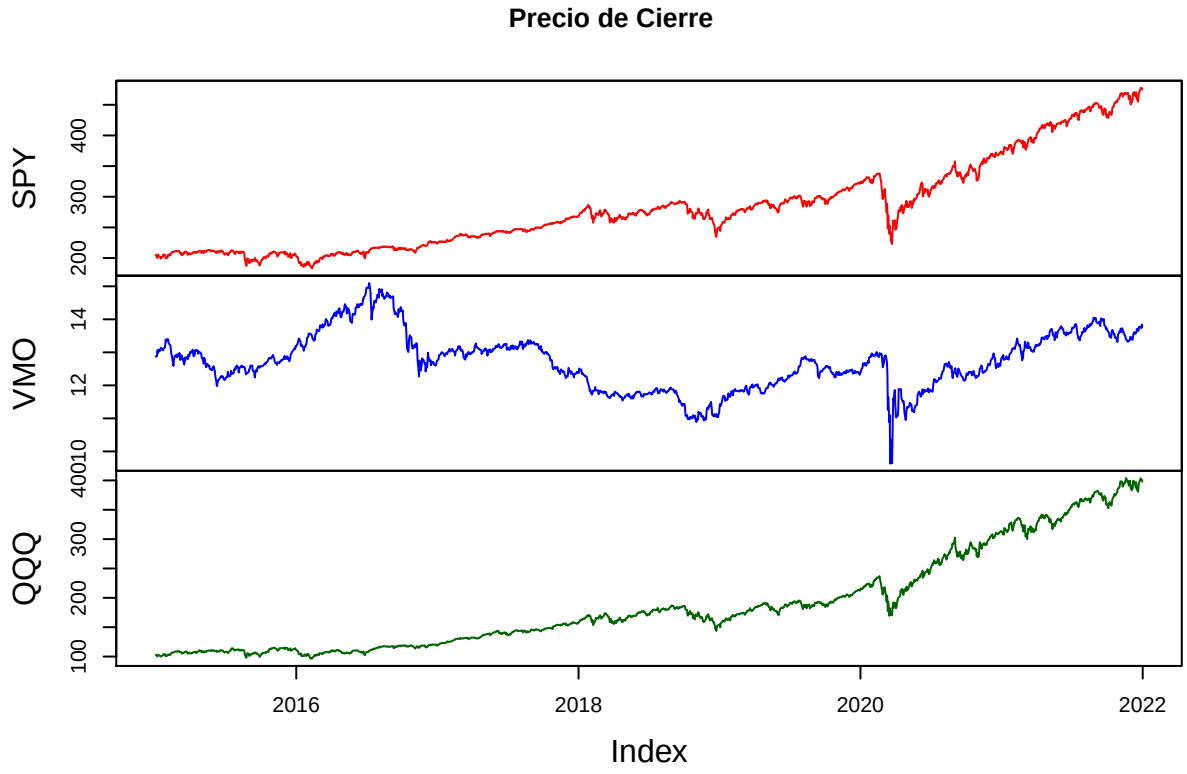
```
## Define variables
av_api_key("F11AG45Z8NP9EFPY")
desde <- '2014-12-31'
hasta <- '2022-01-01'

# Obtiene Datos de Alpha Vantage API
SPY <- av_get(symbol = "SPY", av_fun = "TIME_SERIES_DAiLY", outputsize="full") %>%
    select(timestamp, close) %>%
    filter(timestamp > desde, timestamp < hasta)
VMO <- av_get(symbol = "VMO", av_fun = "TIME_SERIES_DAiLY", outputsize="full") %>%
    select(timestamp, close) %>%
    filter(timestamp > desde, timestamp < hasta)
QQQ <- av_get(symbol = "QQQ", av_fun = "TIME_SERIES_DAiLY", outputsize="full") %>%
    select(timestamp, close) %>%
    filter(timestamp > desde, timestamp < hasta)
```

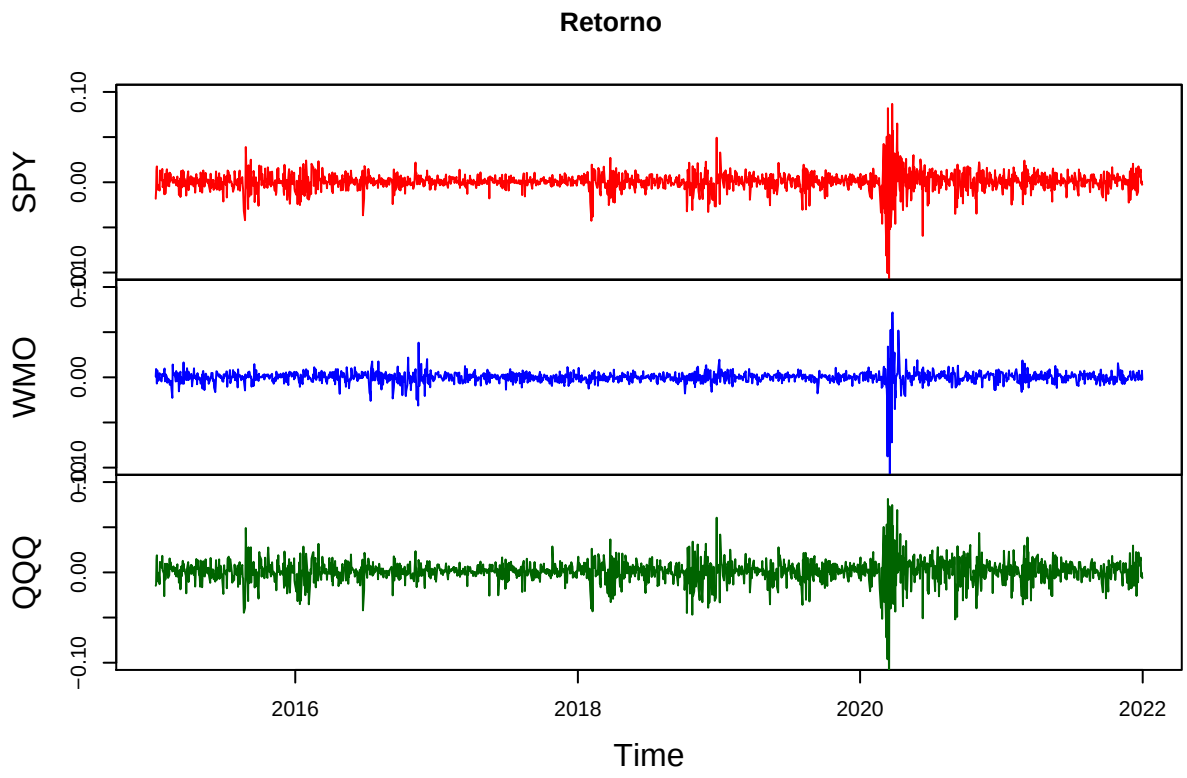
Calcula retornos

```
port <- merge((merge(SPY,VMO, by = "timestamp")),QQQ, by = "timestamp")
colnames(port) <- c("date","SPY", "VMO", "QQQ")
port <- xts(port[,2:4], order.by = port$date)
port_ret <- na.omit(diff(log(port)))

plot(x=as.zoo(port), main = "Precio de Cierre", legend =c("SPY", "WMO", "QQQ"),
     col = c("red", "blue", "darkgreen"))
```




```
plot(x=as.zoo(port_ret), xlab="Time", ylab = c("SPY", "WMO", "QQQ"), main = "Retorno"
     , col = c("red", "blue", "darkgreen"), ylim=c(-0.10,0.10))
```



Calcula retornos y Retorno Ajustado por Riesgo

```
SPY_rr <- mean(port_ret$SPY)/ sd(port_ret$SPY)
VMO_rr <- mean(port_ret$VMO)/ sd(port_ret$VMO)
QQQ_rr <- mean(port_ret$QQQ)/ sd(port_ret$QQQ)

data_res <-  data.frame()

data_res[1,1] <- mean(port_ret$SPY)
data_res[1,2] <- sd(port_ret$SPY)
data_res[1,3] <- SPY_rr

data_res[2,1] <- mean(port_ret$VMO)
data_res[2,2] <- sd(port_ret$VMO)
data_res[2,3] <- VMO_rr

data_res[3,1] <- mean(port_ret$QQQ)
data_res[3,2] <- sd(port_ret$QQQ)
data_res[3,3] <- QQQ_rr

data_res[1,4] <- Return.annualized(port_ret[,1],geometric = TRUE)
data_res[2,4] <- Return.annualized(port_ret[,2],geometric = TRUE)
data_res[3,4] <- Return.annualized(port_ret[,3],geometric = TRUE)

colnames(data_res) <- c("ret", "sd", "rr","ret_anual")
```

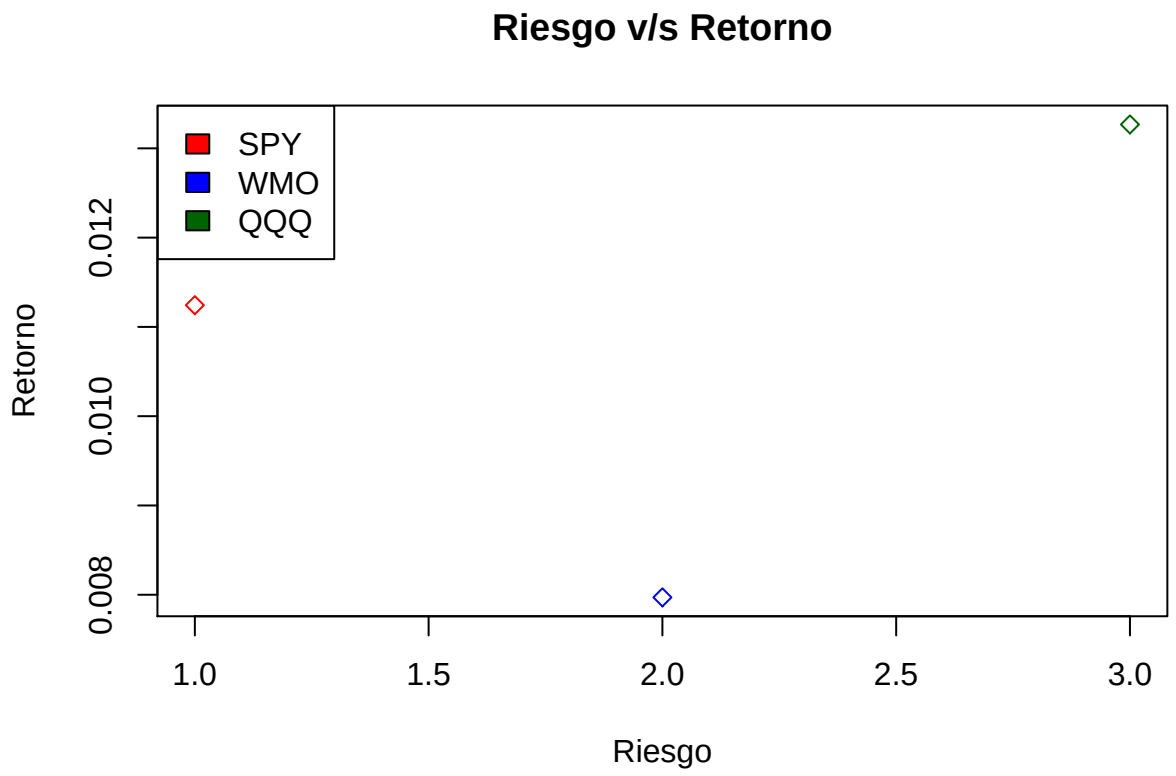
```r
rownames(data_res) <- c("SPY","WMO","QQQ")

print(data_res)
```

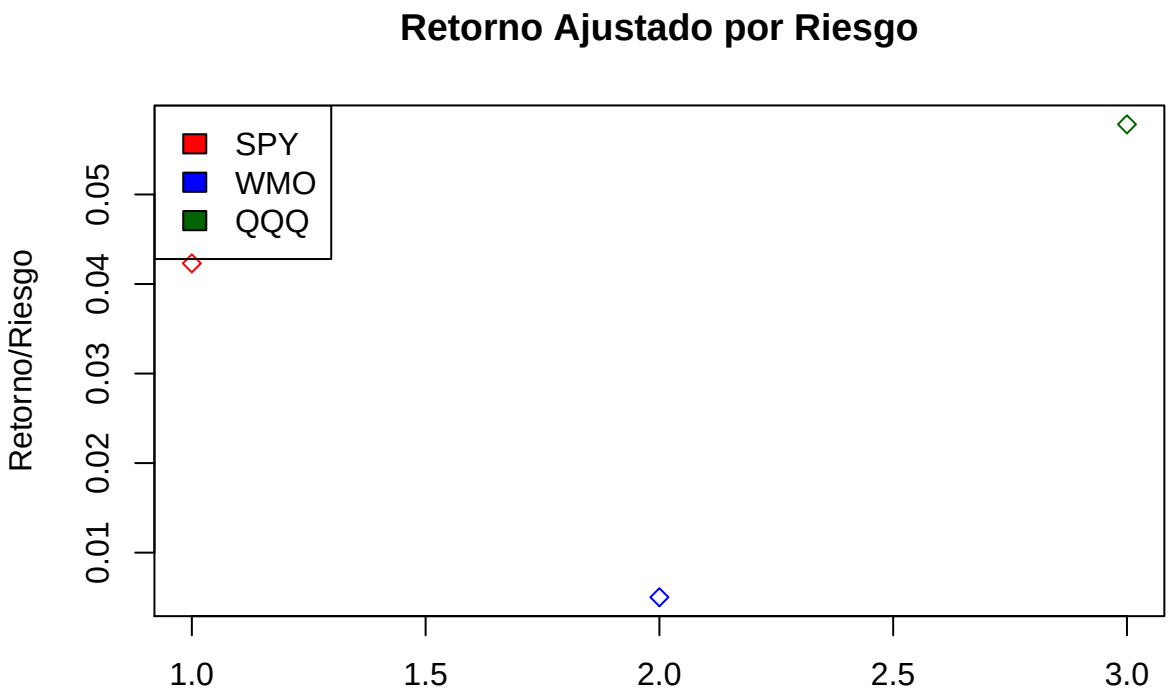
```
##              ret          sd          rr  ret_anual
## SPY 4.756670e-04 0.011243542 0.042305796 0.10936792
## WMO 4.000791e-05 0.007970735 0.005019351 0.00190658
## QQQ 7.672694e-04 0.013267473 0.057830866 0.18645454
```

Grafica

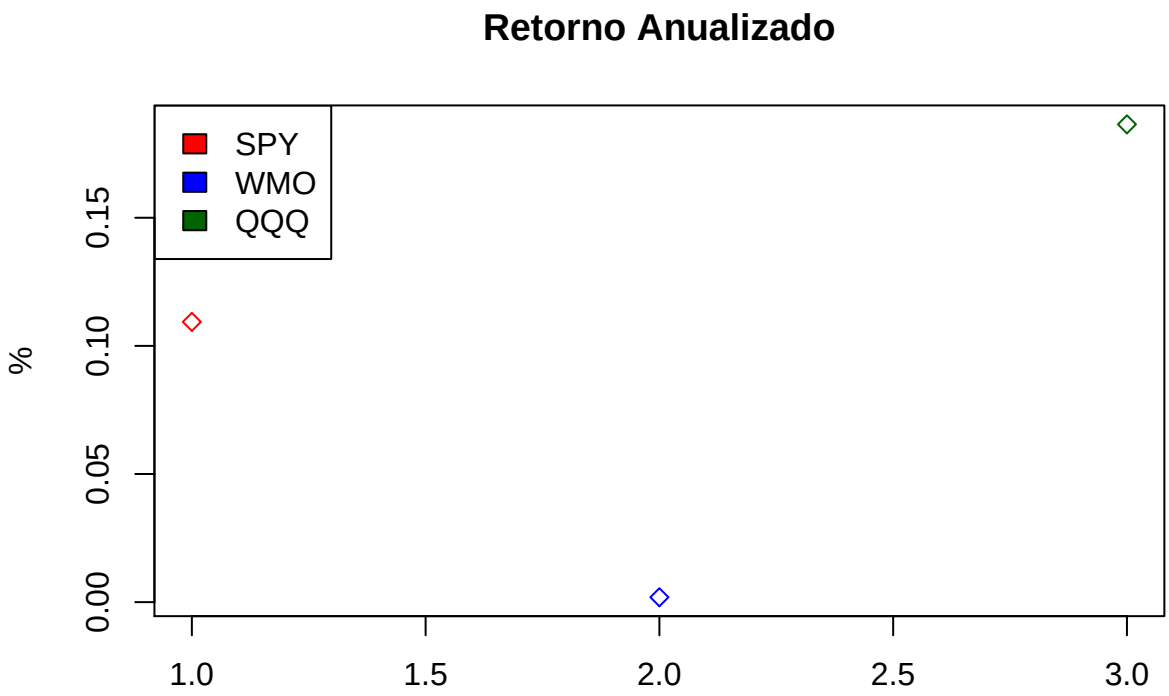
```r
plot(data_res$sd,data_res$mean, main ="Riesgo v/s Retorno", xlab="Riesgo",
     ylab = "Retorno", col = c("red", "blue", "darkgreen"), pch = 23,  cex=1)
legend(x="topleft", legend=c("SPY","WMO","QQQ"), fill = c("red", "blue", "darkgreen"))
```




```r
plot(data_res$rr,main ="Retorno Ajustado por Riesgo", xlab="", ylab = "Retorno/Riesgo",
     col = c("red", "blue", "darkgreen"),pch = 23,  cex=1 )
legend(x="topleft", legend=c("SPY","WMO","QQQ"), fill = c("red", "blue", "darkgreen"))
```



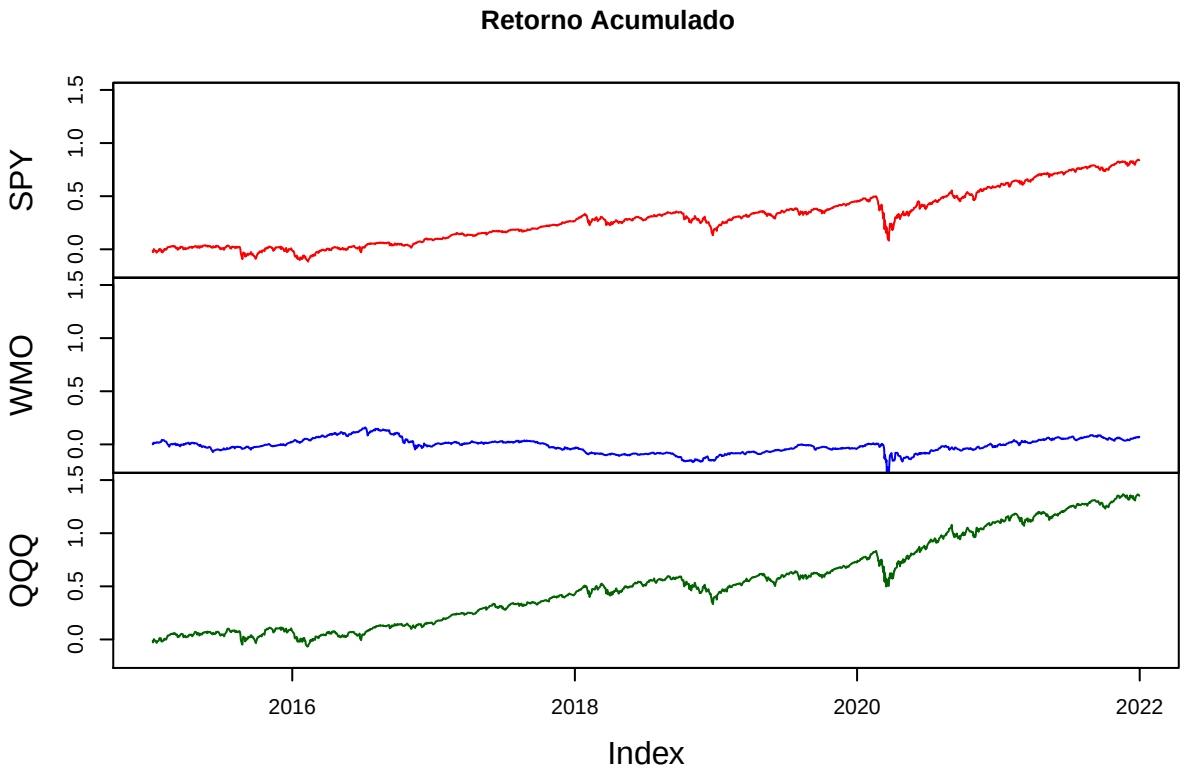

```
plot(data_res$ret_anual,main ="Retorno Anualizado", xlab="", ylab = "%",
     col = c("red", "blue", "darkgreen"),pch = 23,  cex=1 )
legend(x="topleft", legend=c("SPY","WMO","QQQ"), fill = c("red", "blue", "darkgreen"))
```




```
## Compara el riesgo y retorno calculado, ¿Cuál se ve más atractivo?
## La opción que tiene una mejor relación retorno versus riesgo, es el QQQ, y que
## sería la más conveniente considerando que esta relación represente un comportamiento similar.
## También este ETF es el que mejor retorno anualizado ha mostrado, por lo que sustenta esta elección
```

Gráfico Retorno Acumulado Simple

```
## E
plot(x=as.zoo(cumsum(port_ret)),main ="Retorno Acumulado", ylab = c("SPY", "WMO", "QQQ"),
     col = c("red", "blue", "darkgreen"),ylim=c(-0.2,1.5))
```


Retorno Acumulado
SPY
WMO
QQQ
0.0
0.5
1.0
1.5
2016
2018
2020
2022
Index