rm(list = ls())

#Travail de session Finance

#Importation des données

base <- read.csv("C:/Documents/Automne 2019/Finance/travaux/base.csv", header = TRUE, check.names = FALSE,sep=";", dec = ",")

base <- base[-2497:-5323,]

#Calucle des Spreads

rr <-100\*diff(log(base$SP500\_HYB))

rf <- 100\*diff(log(base$SP\_T\_Bond))

CS= rr-rf

dCS= diff(CS)

#Graphe des rendements et de la valeur absolue des rendements

par(mfrow=c(3,2))

plot(ts(rr[1:2496],frequency = 252, start = 2010), xlab="",ylab="", type = "l", col = "blue", main = "S&P500 HYB return")

plot(ts(rf[1:2496],frequency = 252, start = 2010),xlab="",ylab="",type = "l", col = "red", main = "S&P Treasury Bond Return")

plot(ts(CS[1:2496],frequency = 252, start = 2010), xlab="",ylab="", type = "l", col = "green", main = "Credit Spread")

plot(ts(dCS[1:2496],frequency = 252, start = 2010), xlab="",ylab="", type = "l", col = "green", main = "variation du Credit Spread")

#Fonction permettant de calculer les statistiques descriptives des rendements

CS<-as.numeric(CS)

fct <- function(y){

TT <- length(y)

mm <- mean(y)

vv <- sum((y-mm)^2)/TT

ss <- sqrt(vv)

z <- (y-mm)/sqrt(vv)

Sk <- mean(z^3)

Ku <- mean(z^4)

min<- min(y)

max<-max(y)

return(list(mean=mm,variance=vv,Etype = ss, skewness=Sk,kurtosis=Ku, Minimum=min , Maximum=max ))

}

#Statistiques descriptives

fct(CS)

fct(dCS)

# Test de normalité

# Histogramme

h <- hist(dCS, breaks=50, main="Histogram with Normal Curve", xlab="variation de Crédit Spread")

xfit <-seq(min(dCS),max(dCS),length=40)

yfit<-dnorm(xfit,mean=mean(dCS),sd=sd(dCS))

yfit <- yfit\*diff(h$mids[1:2])\*length(dCS)

lines(xfit, yfit, col="blue", lwd=2)

#QQ norm et QQ plot

qqnorm(dCS); qqline(dCS)

#Test de Jacques Berra

library(tseries)

jarque.bera.test(dCS)

# Autocorrélation structure

figure()

par(mfrow=c(2,2), mar=c(5,5,5,5))

# max lags for autocorrelation of returns and returns squared

mlag <- 20

t <- seq(length(CS))

plot(t, y, type="l",

main="(a) CS",

xlab="t",

ylab=expression(y[t]),

bty="l")

plot(t, y^2, type="l",

main="(b) dCS",

xlab="t",

ylab=expression(y[t]^2),

bty="l")

acf(y, lag.max=mlag, plot=TRUE,

main="(c) ACF Credit Spread",

xlab="t",

ylab=expression(acf(y[t])),

bty="l")

acf(y^2, lag.max=mlag, plot=TRUE,

main="(d) ACF dCS",

xlab="t",

ylab=expression(acf(y[t]^2)),

bty="l")

figure()

xi <- seq(-6, 6, 0.1)

f <- bkde(y, range.x=c(-6, 6))

ft <- dnorm(xi, 0, 1)

plot(xi, ft, type="l", col="blue",

xlab="y",

lty=3,

ylab=expression(f(y)),

xlim = c(-6, 6),

ylim=c(0, 0.6),

bty="l")

lines(f, col="red")

#Stationnarité du Credit Spread

#Cointégration