Introduction to Financial Risk Management (with R)

Exercise 9 – Skewness, Kurtosis, Jarque-Bera Test for Normality

Overview

The goal of this exercise is to use R to test if daily log returns are normally distributed.

Skewness, kurtosis, JB test of the daily log returns of the Wilshire 5000 index

In the lectures, we ran the following R script to create a data series called "wilsh":

```
library(quantmod)
getSymbols("WILL5000IND",src="FRED")
wilsh <- na.omit(WILL5000IND)
wilsh <- wilsh["1979-12-31/2017-12-31"]
names(wilsh) <- "TR"
```

Next, we calculated its daily log returns:

```
logret <- diff(log(wilsh))[-1]
```

In the lectures, we used the "moments" package in R to estimate its skewness, kurtosis, and to perform the Jarque-Bera test of normality.

Skewness: The coefficient of skewness is estimated using the "skewness" function in the "moments" package in R.

```
library(moments)
rvec <- as.vector(logret)
round(skewness(rvec),2)
```

Kurtosis: The coefficient of kurtosis is estimated using the "kurtosis" function in the "moments" package in R.

```
library(moments)
rvec <- as.vector(logret)
round(kurtosis(rvec),2)
```

Jarque-Bera test of normality: The JB test of normality is performed using the "jarque.test" function in the "moments" package in R.

```
library(moments)
rvec <- as.vector(logret)
jarque.test(rvec)
```

Skewness, kurtosis, JB test of normality of the daily log returns of Gold

In Exercise 2, you retrieved the price of gold in the London Bullion Market at 3pm from FRED: "GOLDPMGBD228NLBM"
You calculated its daily log returns from 1979-12-31 to 2017-12-31.

In this exercise, you will calculate its skewness, kurtosis, and JB test of normality using the "moments" package in R.