

Introduction to Financial Risk Management (with R)

Exercise 5 – Estimating Parameters of the Normal Distribution

Overview

The goal of this exercise is to use R to estimate the two parameters of the normal distribution: mean and standard deviations, for the daily log returns of Gold.

Estimating the parameters of the normal distribution for 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]
```

Assuming that daily log returns are normally distributed, we used the following R commands to estimate the two parameters of the normal distribution: mean and standard deviation.

```
round( mean(logret), 8 )
round( sd(logret),8 )
```

Note: The “round” function in R displays a given number of decimal places for the estimated mean and standard deviation, without changing the values of these estimated parameters.

Estimating the parameters of the normal distribution for daily log returns of Gold

In Exercise 2, you retrieved the price of gold in the London Bullion Market at 3pm from FRED: “GOLDPMGBD228NLBM”

In this exercise, you will estimate the mean and standard deviation of the daily log returns of Gold, from 1979-12-31 to 2017-12-31.