

1. Descriptive statistics

1.1 The variable “Stock” is the stock price of a company quoted on an international exchange.

Give summary statistics for price and daily **returns**¹ and comment your results. The information you produce should be contained in two pages maximum for tables and eventually graphs and one page for comments.

1.2 The variable “Index” is the value of a stock market Index.

Represent graphically the series, what can you say about the measures of central tendency and dispersion?

Indicate the first and third quartile of the “Index” series.

1.3 The variable “Volume” is the daily volume of trade of Stock

Present a histogram of the frequencies (you will have to define appropriate intervals in order to group the observations, justify your choice).

What can you say about the form of the distribution?

2. Inference and hypothesis testing

2.1 Suppose the daily returns of “Stock” follow a Student t distribution.

- What is the probability that a return be superior to +3%?
- What is the probability that a return be between -2% and +4%?
- Give a 95% confidence interval for the population mean
- Is the mean of the daily returns of “Stock” significantly different from the mean of the daily returns of “Index”.

2.2 Would your answer be different if you did not know what kind of distribution follows the population?

3. Regression

Consider the daily returns of Stock as the dependent variable and the daily returns of Index as the independent variable in a simple regression.

- Compute the estimates for a and b in $y = a + bx$,
- Give a graphical representation of your results
- Test the significance of both estimates (is your estimate of a different from zero, is your estimate of b different from zero?)
- How would you measure and qualify the explanatory power of this regression?

¹ You have to compute the daily returns: $r = (\text{price } 1 / \text{price } 0) - 1$. You may choose to compute returns using other methods / formulas but you have to clearly state what was used and why.