

# Homework 2

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Rules: document your results in a Word file (or PDF). You should **not insert code** into the documentation (unless specifically requested). **Insert the plots** you create into the documentation as well. In the documentation you should **indicate which task** you are writing about. You are **not allowed to use for-cycles** unless instructed otherwise! Besides the documentation you should **attach your Python code as a .py file** to the email as well! The **deadline is April 3**.

- 1) Select two arbitrary companies you would like to analyse. Document your choices!
- 2) Download their historical prices from *Yahoo! Finance* from January 1, 2010 to March 22, 2016, and combine them into a single dataframe (keep only the close prices). In the new dataframe the column names should indicate the stock names. Make sure that the index contains actual date-type objects, not just strings.
- 3) Convert the prices to returns. Copy the dataframe content into the documentation!
- 4) Familiarize yourself with the data – plot both the prices and the returns for both stocks and document your observations.
- 5) Print a quick summary of the returns. You can leave the counts out, but what are your conclusions based on the other measures? Interpret the percentiles as well! Document the summary output and your interpretations.
- 6) Plot the histogram of both stock's returns and indicate the expected return with a vertical red line – document your observations.
- 7) Create two scatter plots - one should have the prices of the two stocks in the X and Y axes, the other should have the returns. Can you see some kind of relationship between the two stocks (either by the prices or the returns)? Document your findings.
- 8) Calculate the correlation of the two stocks. Does it tell you the same as the scatter plots?
- 9) Fit a linear curve to both stock's returns. In two different figures plot the returns of the two stocks and draw the fitted lines on them. Calculate the  $R^2$  statistic of the fit as well. How well do the linear models fit the returns? Document the linear model as an equation too.
- 10) Calculate the skewness and kurtosis of the returns and document them. What do they tell you?
- 11) Test whether the expected returns and variances are equal or not. Document the console output and your conclusions.
- 12) Test whether the returns of the two stocks come from the same distribution or not. Document the console output and your conclusions.
- 13) Document which stock would you buy and why.