Recitation 3

September 23, 2022

Question 1

Steps:

- Come up with your null and alternative hypothesis
- Use level of significance (alpha level) $\alpha = 0.05$
- Determine whether a left-tail, right-tail or two-tailed test is appropriate
- Calculate the sample mean
- Identify the population mean
- Use the data provided to calculate sample mean, degree of freedom, standard deviation and standard error of mean (SEM)
- Use the formula to calculate t statistics (include p-value) or alternatively look for functions in MATLAB or Python to do this
- Based on the results, explain whether the null hypothesis is rejected or not

Question 2

Steps:

- Come up with your null and alternative hypothesis
- Use level of significance (alpha level) $\alpha = 0.05$
- Determine whether a one-sample, two-sample or paired test is appropriate
- Calculate the degree of freedom
- Calculate the t-statistic and p-value
- Give explanation based on the results obtained

Question 3

Steps:

- Download the required datasets
- Find ways to deal with the first rows which are not required
- Make a scatter plot for Fertility Rate against GDP per capita PPP using the year 2013 for each dataset and label the graph
- Give your interpretation of the graph
- Calculate the correlation coefficient using the same columns, there are functions to do this is MATLAB and Python
- Give your interpretation of the estimated correlation coefficient

Question 4

Steps:

- Download the required datasets
- Plot a carefully labelled time series graph of UK monthly indices (Post ‘91)
- Give your interpretation of the graph
- Use the formula provided to calculate the monthly returns
- Plot the ACF function using the monthly returns. There are functions to do this in MATLAB and in Python.
- Label the graph carefully by indicating the values of the ACF at $p<0.05$ by using horizontal lines
- Give your explanation on whether there is evidence of seasonality
- Calculate the annualized return for this period as a percentage

Question 5

Steps:

- Download the FTSE100 dataset from Yahoo Finance
- Calculate the FTSE100 returns by using the Adjclose column
- Calculate cumulative sum of returns for FTSE100 and average monthly house prices
- Normalize cumulative sum of returns to start at 100
- Plot the the normalized cumulative sum of returns for both FTSE100 and average monthly prices on the same graph
- Calculate the annualized return from the FTSE100 for this period
- Using the results obtained, explain whether it was better to invest in a UK house or the UK stock market over this period

Logistics

- Label all your graphs (including labels for all axes, titles and legends if needed)
- Please submit all the files required in **one folder** and use **format stated** on the assignment to name your files
- Only submit stated files in the assignment. Do not submit assignment questions, recitation slides e.t.c
- Only **.m and .ipynb** files are accepted for the code and please submit only file for your code
- Request extension 48 hours before deadline and make sure to copy your academic advisor, Professor McSharry and all the TAs in the email, also provide proof why you want an extension

Logistics

- Make sure you submit all the files required. Missing codefile, datafiles or report may attract penalties.
- The accepted format for the report is a **.pdf**
- Make sure the codefile submitted in the zip file runs without errors.
- Make sure you load the data from the correct path!
- Do **not** include **code** in the report.
- Do not create other folders in your submission folder
- Check your submission before you submit otherwise you might submit the wrong files