

EC2021: Intermediate Econometrics

Coursework # 2

2022-23

This coursework is worth 50 percent of your overall mark. It consists of **two** questions. You must answer all questions.

Submission Rules

1. The deadline to submit the coursework is **Monday, 24 April 2023** at 16:00 via Moodle.
2. This is an individual assignment to be completed independently.
3. Collaboration is not permitted. Please do not make the mistake of replicating somebody else's work (or part of their work). This can have some serious academic misconduct consequences. Cases of plagiarism will be dealt with according to university policies.
4. Write your answers in word using font size 11 and submit your coursework as word or pdf file.
5. There is a word limit of 1,500 words that applies only to textual material. It does not apply to graphs, numerical calculations, and algebraic derivation. You should feel free to distribute the number of words across the questions as you see fit (i.e. more words in some questions and fewer words in other questions). The acceptable 10% above or below the word limit applies.
6. Equations should be inserted into the document by using the Equation Editor object. Graphs and figures from Stata/Excel can be copied and pasted in your Word file as images.
7. Make sure that, in order to avoid possible late submissions, you start uploading your file well in advance of the deadline and, possibly, no later than one hour before the deadline. Be aware of the size of your file and of the time it can take to upload the file, in particular if your internet connection is not very fast.
8. Remember that if you are experiencing any technical problems during the upload of your file you should also email your file to the course officers at economics.ug@city.ac.uk before the submission deadline.

Question 1 [50 marks]

The file named BARC.XLSX contains daily observations of the Barclays Plc stock prices (note: they are not returns).

- a) Copy and paste the data in Stata and define them as time series using the appropriate Stata commands. Provide a plot of the data and a brief interpretation. Is the series stationary? Explain your answer without any econometric test. [10 marks]
- b) Transform the data to logarithmic returns. Provide a plot of the data and discuss what you see. Do you see evidence of conditional heteroskedasticity? [10 marks]
- c) Compute the Engle's LM test for autoregressive conditional heteroskedasticity for 1 and 6 lags. Present the Stata output and discuss your results. Do you have ARCH effects in the series? [10 marks]
- d) Estimate five alternative ARCH/GARCH models (the mean equation can be a simple AR(1) model), present your results in a summarized table and use appropriate tests to conclude which model is the best. Provide an economic interpretation of your findings. [20 marks]

Question 2 [50 marks]

The file Data_GDPpc_UNEMP-NEW.xlsx contains data for real GDP per capita and unemployment rates for 1960–2019 for all countries (data are taken from the World Bank, World Development Indicators database; for further information see: <https://databank.worldbank.org/source/world-development-indicators>).

- a) Create a new file in Stata, with yearly data for 1960–2019. Copy and paste data for the two series for a country of your choice (choose a country that its name starts with the initial of your last name... for example if your surname is ASTERIOU choose ALBANIA or any other country that starts from A). Provide plots of the data and briefly discuss them. Do they seem stationary? [10 marks]
- b) Follow the steps described in the Box-Jenkins approach to identify the best ARIMA model for both the unemployment rate and the GDP per capita series. What do you conclude? Provide an economic interpretation of your findings. [20 marks]
- c) Apply all necessary tests to determine whether there are unit roots for both the unemployment rate series and the GDP per capita series (do repeated tests until the series become stationary). What do you conclude? Provide an economic interpretation of your findings. [20 marks]