

# NEKN34 - Time Series Analysis, Spring 2023

## *Computer Lab 2*

January 25, 2023

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## Replicability in Econometrics

### ARCH/GARCH Modeling

**Deadline:** 5th of March, 23:59

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Scientific research in general and economics in particular plays an important role in the development of the society. However, the results of a particular study are considered to be reliable only if they can be replicated. A replication study aims at confirming the validity of the results published in peer-reviewed journals. The attention towards such studies in economics has been increasing over the past years (see Mueller-Langer et al. [1], for a detailed discussion). Given the importance of such studies your task in this assignment is to provide a replication of published results.

For this assignment you receive two published papers. Tse [2] analyses the conditional heteroskedasticity of the yen-dollar exchange rate. Tsui and Ho [3] then conduct a replication study of the paper by Tse. The data used in those papers are available in the Journal of Applied Econometrics data archive. However, you are provided with a data set from a different source. The file `ExchangeRate`<sup>1</sup> can be downloaded from Canvas together with limited relevant literature. In the file you will find the Dollar Yen Exchange Rate (USD JPY) on daily basis (trading days). The data spans from the 4th of January 1971 till the 13th of January 2021.

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<sup>1</sup>The data has been downloaded from “[www.macrotrends.net](http://www.macrotrends.net)”.

Your task is to use the given data to analyse the conditional heteroskedasticity of the yen-dollar exchange rate using methods covered in Topic 3: “Modeling volatility”, and then compare your results to those of Tse [2] and Tsui and Ho [3].

The results should be reported by means of a short research paper which is no longer than 10 pages. The structure of the report should follow a classical academic paper. See tips.pdf containing some tips on what to think of when preparing your report. This can be found under the “Intro” module under the section “Course Structure” on Canvas. Provide the motivation and reasoning behind your choices.

## **General Guidelines**

The following guidelines are just some help for you. You are free to structure your report in the manner of your choosing, i.e. the choice of modeling strategy is up to you. There is no right or wrong answer for the assignment. It is therefore important to carefully motivate your choices and results. You may use additional sources of information and data if deemed necessary (make sure to provide an access link in that case).

The analysis typically start by exploring the data. Which data do you have? How does it relate to the data analysed in the two papers? It is important to pay attention to which variable is actually modeled in order to make your results comparable.

You will have to make a choice regarding the models you estimate. Make sure you provide a reasoning. In addition to the choice of models, you will also have to decide which time period you want to consider. Would it be interesting to consider exactly the same period as in the paper or not? Or maybe you would want to look at multiple time spans?

What can you conclude from your results? How do they compare to those of the published papers?

## References

- [1] Mueller-Langer, F., Fecher, B., Harhoff, D., and Wagner, G. G. (2019). Replication studies in economics—how many and which papers are chosen for replication, and why? Research Policy, 48(1):62–83.
- [2] Tse, Y. K. (1998). The conditional heteroscedasticity of the yen–dollar exchange rate. Journal of Applied Econometrics, 13(1):49–55.
- [3] Tsui, A. K. and Ho, K.-Y. (2004). Conditional heteroscedasticity of exchange rates: further results based on the fractionally integrated approach. Journal of Applied Econometrics, 19(5):637–642.