CS3 Rubric - Predicting US Treasury Rates

DS 4002 – Spring 2024 - Ashley Luk
Due: TBD
Submission format: Upload link to github repo and submit pdf to Canvas

Individual Assignment

Why am I doing this? This case study allows you to leverage your data science knowledge by using time-series analysis techniques to forecast US Treasury bond interest rates. As you work through this assignment, you will be exposed to the ways that data analysis can be used in a real-world context with potential implications for financial decision-making and risk management.

What am I going to do? The GitHub repository for this case study can be found at https://github.com/akl5mjz/CS3-DS4002. You will obtain historical data on US Treasury bond interest rates and relevant macroeconomic indicators. The GitHub repository contains a cleaned dataset for you to use. After obtaining the necessary data, you will use, run the master script file which has all the analytical tools needed. You will use a time-series regression model in Python to forecast future US Treasury bond interest rates based on these factors. The model should be trained and tested on the provided historical data. Finally, you will use the model to generate interest rate predictions for a future time period and assess the model's performance.

Your final deliverables should include:

- A GitHub repository containing all materials used
- A brief written report summarizing your analysis, results, and conclusions

Tips for success:

- Try to focus more on the practical applications of predicting Treasury bond interest rates and how it relates to real-world financial decision-making.
- Don't worry about completely grasping the technical jargon associated with treasury bonds (i.e yield, duration, convexity, etc.)
- Have fun with it!

How will I know I have Succeeded? You will meet expectations on this case study when you follow the criteria in the rubric below.

Formatting	Submit each component listed in the rest of this rubric as advised below. ● Written Portion: ○ Submit the written portion as a PDF file. ● Data & Code: ○ Submit code created for all portions in a GitHub repository.

	○ Include any additional data that was used in GitHub if necessary. ○ The GitHub should be titled “CS-[insert first & last name]-Projecting Treasury Rates” ● References: ○ References should be included on a separate page at the end of the Written Portion PDF file.
Written Portion	Discuss your interpretation and process of going through the project by answering these questions in 2-3 paragraphs: ● Problem statement and importance ● Datasets and variables used ● Key findings from exploratory analysis ● Time-series model used and rationale ● Model performance and predictions ● Implications of results for financial decision-making ● Challenges encountered and future improvements
Code	Your code should be submitted as part of a github repo which will include the following: ● A data file including whatever you used ○ A cleaned data file is provided for you in the “data and code” file in the repo ● A time series regression analysis and model using techniques of your choosing ○ A sample code is also provided for this in the “data and code” file ● Any additional resources you utilized
References	Please cite all resources used in the end of the written portion: ● Include brief annotations under each citation explaining how the reference informed your work.