ECO 420Y Project: Testing Efficient Market Hypothesis for Bitcoin (15 Points)
due at the beginning of final exam

Part I: Literature Review (6 Points)

Read an article related to Efficient Market Hypothesis. The link to the article is
http://www.fsb.miamioh.edu/lij14/420n_paper_emh.pdf

Literature review (6 Points): summarize the above article in 300-500 words with standard margin and fonts. Please comment on how to relate EMH to the predictability of return.

Part II: Data Analysis (9 Points)

Section 1 (2 Points). Download the most recent Bitcoin price data
- Visit the FRED website https://fred.stlouisfed.org and locate the Bitcoin price data series (code: *CBBTCUSD*)
- Download the most recent daily closing price data
- Load the data into R

Section 2 (2 Points). Statistical Analysis
- Compute daily returns
- Draw time series plots of price and daily return
- Provide a table of descriptive statistics of price and daily return
- Test unit root for price and daily return

Section 3 (3 Points). Consider using R loop to obtain a series of t values based on rolling windows (window size is 28) for the autoregressive slope coefficient ϕ_1 in the AR(1) regression (you may chapgpt sample codes for rolling window regression)

$$y_t = \phi_0 + \phi_1 y_{t-1} + error$$

where y is the daily return of Bitcoin. Plot the series of t value of ϕ_1. Do you find evidence against the weak-form efficient market hypothesis?

Section 4 (2 Points). Do the rolling window analysis again, and plot the p-value of Box-Ljung test applied to daily return of Bitcoin. Do you find evidence against the weak-form efficient market hypothesis?

For Part II, you need to explain your finding so that a non-specialist can understand. In Appendix of project, you should include you R codes (not results) for Part II.

You need to email me the project paper in one PDF file before the final exam starts. The points you will get depend on the quality rather than the length of the project paper. Do not put your name on the term paper. Instead, put it in the name of PDF file such as 420Y_project_yourname.pdf.

In short, this project provides hands-on experience with time series forecasting, model evaluation, and business writing—three key skills for financial data analysis