Financial Econometrics
2022/23
Homework 1

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Due Date: Monday, January 16, 2022. Please, hand in your results as PDF files. Jupyter notebook pdfs with comments are also ok

Problem 1: You are one of the referees of the Journal of Finance and you are as critical as your peers are with you. You have been asked to write a referee report of the paper: Paul Glasserman, Fulin Li, Harry Mamaysky, Time Variation in the News-Returns Relationship, 2022. For your information, Fulin is a Ph.D. candidate on the job market (whom we will interview and whom we d'like to hire). What is your recommendation?

Problem 2: In Lecture 1 we have discussed how the simple Euler equation can be calibrated by using actual data. Please go again through the calculus leading to formula 19, page 6 of the first lecture notes. Implement this formula in Python/Numpy and verify my numerical calculations (never trust the calculus of others especially not of your professors)! If risk aversion increases, what do you think should happen to the expected gross return of assets? What should happen to the equity risk-premium? Can you trace the equity risk-premium as a function of γ? What do you conclude about this simple model?

Problem 3: You have been given the data file: GMMData.csv. Load this USA data in a Panda. Transform the time into datetime. The data is monthly. The various columns are the SP500 stock market index. A dividend for the SP500 (your data provider has not specified where this comes from). Then the CPI (consumer price index), a 10 years horizon fixed maturity interest rate and the series of all US consumption (in billions of USD, seasonally adjusted).

Question 1: construct the real log consumption growth ratio.

Question 2: construct the real monthly stock market return (simple return is ok but with correctly adjusted dividends). Use your intuition to get the orders of magnitude correct.

Question 3: construct the real long-term interest rate.

Question 4: Present the usual suspects (mean, standard deviation, skewness and kurtosis) annualized! Correlation of this crowd.

Question 5: Present visually the data. What do you think about the quality of this data?