Final

Due: Dec 21, 2020

Question 1: (30 Points)

- Download the equity prices for the ticker "SPY" from 2019-01-01 (to now).

- Calculate the daily log returns for SPY using the adjusted close prices.

- Plot the above daily log returns in red line.

Question 2: (20 Points)

- Calculate the skewness and kurtosis of the SPY daily log return from Question 1, for both adjusted and unadjusted ones.

- Report the results using a 4×4 table (data frame or matrix) such that: The column names are "SPY.skewness" and "SPY.kurtosis". And the row names are by "Unadjusted" and "Adjusted".

Question 3: (50 Points)

- Download options prices for ticker "SPY" for all expiration dates (or maturities).

- For calls and puts of each expiration date, add a column of "Price", which is the average of "Bid" and "Ask".

- For calls and puts of each expiration date, add a column of "ImpliedVol", which is the implied volatility of the corresponding options.

- Choose 3 expiration date for put options, plot volatility smiles (ImpliedVol ∼ Strike, see page 22 in L9).

- Keep fields "Strike","Bid","Ask", "Price", and "ImpliedVol" and save the calls and puts of each expiration date in .csv file. Submit one of the .csv file also. (see page 20 in L5 and HW3 Q1.5, format for file names is not restricted)