Assignment 3

Due: Oct 26, 2020

Question 1: (50 points)

- Download option prices of ticker ^VIX for all expiration dates and name it "VIX"
- Download the current price (last quote price) for VIX
- For calls and puts at each expiration, add a column of "Price", which is the average of "Bid" and "Ask"
- For calls and puts at each expiration, add a column of "moneyness", which takes value TRUE when it is out-of-money, and FALSE otherwise.

  (A call option is out-of-money when its strike is greater than current price of underlying. A put option is out-of-money if its strike is less than current price of underlying. And the current price of underlying is from the second question)
- Delete all the fields except "Strike", "Bid", "Ask", "Price", and "moneyness", and save the calls and puts for each maturity in .csv files with the format "VIXdata2020-01-08Exp2020-06-17puts.csv", where the "2020-01-08" should be the date you download the data, and the "2020-06-17" should be the date of expiration

You may generate many .csv files, besides your .pdf report, please submit one of the .csv file.

Question 2: (50 points)

- Without using packages, create a function of 2 variables "x" and "adjusted" that calculates the sample skewness of "x". When "adjusted" = TRUE, it returns the adjusted skewness of "x", and FALSE returns unadjusted one.
- Without using packages, create a function of 2 variables "x" and "adjusted" that calculates the sample kurtosis of "x". When "adjusted" = TRUE, it returns the adjusted kurtosis of "x", and FALSE returns unadjusted one.

- Download historical price for ticker "SPY" for the whole 2012 and 2013 years, use its adjusted close price calculate daily log return
- Calculate the adjusted and unadjusted skewness for the daily log return of SPY using the function you defined
- Calculate the adjusted and unadjusted kurtosis for the daily log return of SPY using the function you defined