

Assignment 3

Due: Oct. 18th, 2016 at 9:59 am

Question 1: Get familiar with Quantmod

For this question, you can not using any other package to finish it

- Download daily data for JPM from yahoo finance, download daily data for C from google finance. Time period for both stock should from 2010-01-01 to 2015-12-31
- Calculate daily return, weekly return, monthly return for JPM and C with function from quantmod. For this question, you need calculate simple return and log return. In another word, you should have 6 different vector about returns in total.
- Use `chartseries()` to plot stock price for JPM. In this plot, you should not show volume, instead, you need to add two stock technical index. Those two index have to be shown in one plot, if you code return me 2 separate plots I will not give you points for this question.
- Explain how to use the index you select and write down the equation about who to calculate this index.

Question 2: Stationary and normality

For this question you need to use 6 return series from previous question

- Test all 6 returns are they stationary. Explain your result
- Test all 6 returns are they apply to Normal. Explain your result.
- Calculate skewness and kurtosis for 3 returns from JPM. Tell me they are left skew or right skew, heavy tail or short tail
- Calculate auto-correlation for JPM daily return up to lag 10

Question 3: Function and for loop

For this question, you have to write a function to finish, in this function you need to set up 4 input variable

- stock name
- start date
- end date
- period

Now, search the newest list for Dow 30 companies and download daily data for all the 30 companies. I needs 2 time period data, start from 2010-01-01 to 2010-02-01 and start from 2016-01-01 to 2016-03-07. Tell me the mean value for daily return and weekly return. Your result should be in table and looks like this:

Ticker	Start date	End date	Mean for daily return	Mean for weekly return
MMM	2010-01-01	2010-02-01	0.30321	0.4321
...

Hints:

- Your function should return you a vector or list after each calculation.
- Use for loop to control change of date and stock name.

Question 4: Intro to HFT(2)

Use AAPL.O from previous homework, this time let's do something new

- Read AAPL.O.csv, this time I need you to subtract all Trade information
- Calculate time difference for each trade and make a histogram, tell me whether it is apply to Normal
- From your csv file you will see the data is start from 9:30am and end at 4:00 pm. Now split your data into three section, 9:30 11:30, 11:30 14:00, 14:00 16:00.
- For each section, tell me is trade price apply to Normal? Also make a histogram for trade volume, your Y-axis should be density rather than frequency
- In high frequency trading, every time when you submit order, the minimum requirement is 100 share. Hence we expect all the trade volume should be integer after divide by 100. For this kind of volume, let's call it normal trades. Now calculate the proportion of normal trade in different time section. To finish this question, you should write a loop or function, rather than do it individually.