Midterm Exam QF202: Part II

Wednesday, March 21, 2018

- There is only 1 problem worth a total of 100 points.
- You need to create a word file generated by RMarkdown, and upload your file in canvas. You can use your personal laptop or the computers in the Lab.
- This is an open-book exam. However, communication with other students in any way is forbidden

Problem 1: You need to use quantmode package in R to download the data required for this part.

1. Download daily data for the last 3 years for the equities listed below.
   - JPM
   - GS
   - BAC
   - C
   - WFC
2. The so called log return or continuously compounded return on an interval $[t, t + \Delta t]$ is defined as:

$$R_t = \log \frac{P_{t+\Delta t}}{P_t},$$

   where P_t and $P_{t+\Delta t}$ are the equity prices at the moments in time t and $t + \Delta t$. Using the data you downloaded calculate **monthly** log returns for the 5 equities using the close prices for each month. Then calculate the mean monthly return for each of the 5 equities. Output these values.
3. Calculate correlation between monthly returns. Which pair of the equities has the highest correlation?

4. Using the two equities with the highest correlation between monthly returns build a linear regression model. You can use any of them as the explanatory and obviously the other as response. If you have not done part 3 use any two equities.

5. Please interpret the results you obtained from the regression model. Write down the regression model. Are the parameters in the model significant? What is the coefficient of multiple determination?

Problem 2: (Bonus: 20 Points) Many of the classic finance models assume that equity's return is Normally distributed, and stationary. Using the monthly log return you calculated in the previous question (all 5 monthly return) test for normality and stationarity of the return distribution. You will need to research online about this since we have not talked about it yet. Explain and interpret the answers you obtained.