AMS 315
Data Analysis, Winter 2018
Computing Project

This project is due 11:59 PM, Friday January 19. This is a 3-member group project. Every group should email me a compressed file including your pdf report and code files. Your names should be in the report. Every member in one group will be given the same points.

Report Requirements:

You need to pick two stocks or indexes that you believe will be highly correlated, and find a linear relationship between their daily log-returns. $\text{logreturn} = \log\left(\frac{Y_{i+1}}{Y_i}\right) = \log(Y_{i+1}) - \log(Y_i)$, Y_i is the daily adjusted close price. You should use data from December 2016 to November 2017 as training data (you use that data to fit your model). You can download data from Yahoo Finance.

You should contain the following in your report. All variables in all questions are the logreturns:

a) Determine if the expected log-return of each stock or index is equal to zero.

b) Find if the expected log-returns are significantly different from each other.

c) Calculate the correlation between the 2 stocks or indexes, and test for significance. (There may be some interesting changes of correlations during financial crisis period. You can test out of class if anyone is interested, but that is not required in this report and will not get extra credits.)

d) Pick one stock as your dependent variable and the other as the independent variables. Determine the linear model. Report R Square. Find the confidence interval for the slope. (You can choose the significance level yourself)

e) Do 1-step prediction for December 2017, which means, using all data before the predicted day as training data and fit a new linear model, and predicting with that model. Find the 95% prediction interval and plot the graph. (In each day, you should predict a logreturn of Y with logreturn of X using the new fitted model you get, and then calculate the predicted price of Y with predicted logreturn of Y and actual price of Y in the previous day. But in the graph, the x axis is date, y axis is your predicted price and real price, and the prediction interval).

You don't need to utilize the formulas we learnt in the class. You can use functions in the program and get answers directly. You should include some important forms and statistics values in your results. Your report should be understood without running your codes.

Format:

Each group should submit a no more than 3 page report. The length will not influence your grade as long as you explain the results well. Your report should be in standard scientific report format. It should contain an introduction, methods section, results section, and a section with conclusions and discussion.

It may include references and appendix. The appendix could include your computer programs (please describe your procedures for computation in your codes). Your group should include whatever additional material it feels is necessary to report

your results in the technical appendix. There are no length restrictions on the references and appendix. A submission of only computer output without a report is not sufficient and will receive a grade of zero.

How to get the stock prices:

Go to finance.yahoo.com
Type in the stock symbol for your company of choice
Select the tab “Historical Data”
Set the desired Time Period and hit Apply
Click “Download Data”