**Econ 4010 Homework 6**

**DUE: Thursday, November 1 (in class)**

This homework assignment will make use of a stock dataset you generate yourself, as well as Google trends data in HWtrends.csv. It will be helpful to look back at Stocks.R, and PeppermintTrends.R in Blackboard while completing this assignment.

For the first questions, use the quantmod function in R to download stock data on Fifth Third Bank (ticker symbol FITB) and Kroger (ticker symbol KR), from January 1, 2018 to October 1, 2018. Run length(FITB), and length(KR) after downloading the data in R to ensure you have 1128 observations.

1. Create a variable of the returns to a $1 investment in Fifth Third Bank from the start of this year. Plot this variable across time below.
2. Create a new variable for the difference of the returns to investment. Plot this variable below.
3. Calculate the standard deviation of each of these variables and write them in a table below. Do you believe the returns to an investment in Fifth Third Bank are stationary? Provide two reasons why or why not.
4. You have been given a tip that the stock price of Fifth Third Bank directly effects the stock price of Kroger, since both companies are based in Cincinnati. The first step in testing this would be to make sure returns to Kroger stock are stationary.   
   Provide at least two reasons why the returns are or are not stationary, and plot the stationary variable you will use in your regressions below.
5. Run a regression with the difference of returns to Kroger stock as your dependent variable, and the difference of returns to Fifth Third Bank as your lone covariate. Include 2 lags of each variable. Print the summary statistics below. Does this look like Fifth Third stock prices affect Kroger stock prices?

For the following problems you will need to use the Google Trends data on searches for ham, leftovers, and Caddyshack located in HWtrends.csv

1. Is the variable “Ham” stationary? Provide at least two sources of evidence for your conclusion.
2. Is the variable “Caddyshack” stationary? Provide at least two sources of evidence for your conclusion.
3. Run an autoregressive model for searches on Caddyshack () where you include 5 lags. Print the summary results below. According to this output, how many lags would the correctly specified model have?
4. You have reason to believe searches for “Ham” affect the number of searches for “Leftovers”. Assuming you would use 2 lags of the dependent variable, and 3 lags of “Ham”, write out the formula for a dynamic equation you would use to test this hypothesis. Run this regression and print the results below.
5. Use a Granger causality test to see if searches for “Ham” can be used to predict searches for “Leftovers”. Remember this is typically done with an F-test! Provide your null hypothesis, and interpret your test results below. What does this say about using Ham in your model?