Economics 741
Homework #5 Assignment
Due 11 December 2017

Please turn in the following:

- A write up
  - If I ask you to compare some numbers, please show me the numbers in the writeup.
  - If you are using LaTeX, print output in table form when it is more than just one number
  - If you are not using LaTeX, paste things into some sort of table
- A .do file
- A .log file

We will first look at the transportation choice. You will want the .dta travel.dta for this; it is on Canvas. The dataset contains five variables: (this data is slightly modified from http://pages.stern.nyu.edu/ wgreene/Text/tables/tablelist5.htm F21.2)

1. *id*: a variable for the id of the choose
2. *option*: an index over the four transportation choices: Air, Train, Bus, Car
3. *choice*: a dummy variable for whether i chose the given j
4. *travel_time*: how much time (in hours) it would cost i to travel by mode j
5. *hh_inc*: income for household i

The second question will focus on time series data. Please find ur.dta and GDP_cleaned.dta on Canvas.
Explore (tabulate, summarize etc.) the data before proceeding!!!.
Please answer the following questions.

1. **Discrete Choice (44 points):**
   (a) Run a clogit of transportation choice on travel time (10 points)
   (b) What percentage of people in the data choose each of the four options? (10 points)
   (c) What are the predicted probabilities with the clogit? (10 points)
   (d) Suppose that planes get quicker, and that the average plane trip becomes one hour shorter. (12 points)
      i. How much less likely (as a percent) are people to fly? (3 points)
      ii. How much more likely (as a percent) are people to take the train? (3 points)
      iii. How much more likely (as a percent) are people to take the bus? (3 points)
      iv. How much more likely (as a percent) are people to take a car? (3 points)
   (e) Report the marginal effect of travel time on the likelihood that someone flies for someone making $20,000 a year and for someone making $80,000 a year. (12 points)

2. **Time Series: For this question you will need to clean some data. Take the ur.dta dataset and merge it with the GDP_cleaned.dta file so that you have data on the average unemployment rate in a quarter and quarterly GDP growth. Keep data from 1950 to present that you can match (i.e. you can't use October 2017). You will want to use the commands "collapse" and "merge" here. With this cleaned data, answer the following questions (34 points)**
   (a) Using only data from 1950 through 2016, test for stationarity in both variables. Ignore drifts and trends. (24 points)
      i. Suppose you are asked to regress UR on GDP growth. In order for this regression to be meaningful, what needs to be true? (4 points)
      ii. Is UR stationary? (3 points)
      iii. If not, how many lags do you need to include for it to become stationary? (3 points)
      iv. Is GDP growth stationary? (3 points)
      v. If not, how many lags do you need to include for it to become stationary? (3 points)
      vi. Can you run a meaningful regression of UR and GDP given what you have found above and any other evidence you may want to explore? If not, run a model with transformations of the variables that would be meaningful. (8 points)
   (b) Run a VAR of UR on GDP growth.
      i. Try this with 1-5 lags. Pick the best model according to the BIC and report only those results. (10 points)

ii. Does GDP growth Granger cause UR? (5 points)
iii. Does UR Granger cause GDP growth? (5 points)