Civil Systems Investment Planning and Pricing (12-706) /
Quantitative Methods for Policy Analysis (19-702) /
Economic Analysis of Private and Public Projects (73-359)

Homework 1 (Due Wednesday Sept. 7 at start of class - 10% penalty per day late)

Note: This is a group homework assignment. You must work in a group, of up to 4 students, in answering these questions. Individual assignments will not be accepted. The whole group needs to only submit one answer on behalf of all group members (be sure to list all group members on your answers). If you use Excel, please print out your cell formulas and values (hint: use CTRL-~).

Question 1 (15 pts): Complete the task that we started in class, namely the group estimation problem. Please submit the following parts:

a) A summary of the question chosen, estimation model used, assumptions, and preliminary result from class (done completely without additional data resources).
b) Do some quick research (e.g., using web searches or - gasp! - actual books at the library) and try to collect better data for your estimation. Do not spend m ore than 45 minutes on this search. Feel free to change your model based on data you find. Write a short summary of data sources searched, used, and final data obtained.
c) With your updated model, provide a summary of your new lower bound, best guess, and upper bound range of estimates.

Question 2 (15 pts): All CMU-affiliated people (faculty, staff, and students) are able to get stickers on their ID cards allowing them to ride the local Port Authority Transit (PAT) buses and light rail vehicles in Pittsburgh. In this problem, you will estimate the number of trips per year taken by all CMU-affiliated people on these vehicles.

Note: Please do each part honestly, without looking ahead. This is how you become proficient at such problems, and 'cheating' by finding the answer ahead of time will only hurt your ability to improve. Remember that I care much more about your 'process' than I do about your answer.

a) Please follow a process similar to what we have done in class to make your estimate. **Use only 'single estimates' rather than 'ranges'** - i.e. you can use midpoint guesses along the way. Feel free to use a calculator for this, but NOT a computer. I want you to do this on paper.

b) **WHEN YOU HAVE AN ESTIMATE from part (a),** validate your answer with the following data sources. For example, **How close** do you think you were you to the "real answer" and **comment** on the 'difference' between your estimate and the real data, specifically on how your choices of assumptions might have led to the difference. Is your estimate **realistic**?

- Data on Carnegie Mellon population (http://www.cmu.edu/ira/facts1.htm)
- PDF file of data I requested previously from PAT about the number of passengers on buses passing through the CMU-University of Pittsburgh area (available at http://www.ce.cmu.edu/~hsm/bca2005/hw/pat-data-oct03.pdf).
- Data on the total rides taken in the Pittsburgh area (http://www.portauthority.org/grow/pgstats.asp).

c) Given your findings in part (b), use a **more complex** analysis (either on paper or via Excel) to make your 'original estimate' better and **give a range** where the actual answer fits. **Use ranges** of assumptions, more robust assumptions, etc.