Home Assignment 1: Task 1:

Use slidedeck 02_01b_CoreLect03_Causality_Correlation_Primer.pdf for this Home Assignment. Note that the content on Selection Bias will prime you for the session on Wednesday, so you might as well take a quick read (if you have not read the section in Mostly Harmless).

- 1.) What are the 4 main sources of endogeneity.
- 2.) Provide a formal definition of Selection Bias, and show how it arises when (naively) comparing outcomes from two groups that are drawn from different populations.
- 3.) Derive the bias that results from omitting x2 in the model y = b1x1 + b2x2 + u?
- 4.) Simulate:
 - a. Do the simulations that are shown from page 20 onwards to illustrate OVB.
 - i. Can you replicate the bias?
 - b. Instead of simply copying everything, try to center x2 around 1.33*x1.
 - i. Can you predict/compute the bias you will get now?
 - ii. What bias do you get?
 - c. Instead of omitting x2, try omitting x1. Can you estimate x2 without bias?
 - i. If yes provide the coefficient estimate and compute the confidence interval.
 - ii. If no, compute the bias (analytically) and estimate the bias using R.
- 5.) Follow all the other steps in the slide deck.
 - a. Example 1 What type of endogeneity does this example highlight?
 - b. Example 2: What type of endogeneity does this example highlight?
- 6.) Which source of Endogeneity do you consider to be the largest problem for your work. Explain why?

Task 2:

Visit at least 2 (better 3) blogs of your colleagues and comment on their home-assignment work. Ideally ask them a question.