ECONOMETRICS II, FALL 2020

Homework 4. Due Wednesday September 23.

1. Use the Matlab `Main_HW4.mlx` program that I have posted. The simulation part is set up to generate a model with "general selectivity" as covered in class. Change this to a standard model of censoring and show that the ML estimation of the standard linear model is biased in the face of selection. (This means that OLS is biased as well.) This code is posted.

2. Merging some of the code from the previous homework into the likelihood procedure, program up the correct ML estimator and show that the estimates from the linear part are not longer biased.

3. Davidson and MacKinnon 11.31.

4. (25% of 2018 Final. For the first question, you have access to the book and notes, but please explain this in your own words.)
a) (10%) Explain what is meant by a censored and by a truncated regression model and explain why a simple OLS-estimate is biased (explain the direction of the bias–it depends on the true slope and on whether the truncation is at the top or the bottom).

b) (15%) Assume you are estimating the model

$$Y_i = aX_i + u_i \ ,$$

by OLS. Here a is a scalar and we assume for simplicity that there is no intercept and that in the true underlying model (not censured or truncated) the error term has mean 0.
Assume that you only have 3 observations: $X' = 2, 4, 6$ and that the data are truncated such that X, Y is dropped for values of Y larger than 6. Also assume that we know that the distribution of the innovation term U is such that it takes only the values -2 and 2 (each with probability 0.5) and that the true value of a is 1.
Find the expected value of the OLS estimator of a (hint: for each value of X find the expected value of the truncated error).