ECONOMETRICS II, FALL 2025.

Homework 3. Due Monday March 15.

1. In Matlab. Simulate a panel AR(1) model $y_{it} = \mu_i + ay_{i,t-1} + e_i t$ a thousand times for different values of the coefficient a to the lag (you can include a constant or not, but estimate the same model as you simulate). Let $T = 5, 15, 50$ and $N = 10$ or $N = 100$). . (Just simulate it for T,N=50,100 and use subsets.)
Use values of a equal to 0.5, 0.9, and 0.99.
i) For $i = 1$ (on cross-sectional unit), find the average of the estimates for these values of a and the values of T given above.
ii) Estimate a in full panel and give the average for the values given for a, N, and T. Notice the bias of a for different values.

Even better if you make a frequency diagram for the estimated values.

2. Use the posted Matlab `Main_HW4.mlx` program. The simulation part is set up to generate a model with "general selectivity" as covered in class. 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.

3. Program up the correct ML estimator and check that the estimates from the linear part are less biased. (We know that the ML estimator in general is consistent, and usually not too biased, but I don't know what the exact bias is, your simulation will show.)