

## ECONOMETRICS II, FALL 2025

### Homework 2. Due Monday September 8

1. Adapting the program from homework 1. Generate data for an ordered probit model and estimate it by Maximum Likelihood (say, a hundred times so you see whether it is unbiased).
2. Consider a panel with  $N$  individuals and two time periods. Econometrician A regresses  $\Delta Y$  on  $\Delta X$  cross-sectionally while Econometrician B run the regression  $Y_{it} = \mu_i + \alpha X_{it}$  where  $\mu_i$  is an individual fixed effect. Verify (using paper and pen) that they get identical fits. (Hint:  $Y_{i1} - Y_{i2} = 0.5 * (Y_{i1} - Y_{i2})$ .)
3. Use the posted Matlab panel data program. (By the way, if you are ahead of the game, by all means use you own data. I am not updating the data because the main issue here is for you to focus on the econometrics tools. You could also use your own program, but not a program like Stata where the formulas are hidden.)
  - (a) Run the regressions with a i) constant only; ii) with state-fixed effects only; iii) with time-fixed effects only; iv) with time- and state-fixed effects. Do the results change. (Beware: sometime you will see people refer to these different models as “robustness,” but the models have different interpretations and there is no reason why they should give similar results.)