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**Special Topics in Applied Econometrics: Cross-Country Studies
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Hands-On Assignment 5: Simulating and Estimating a Pooled Probit Model

Please take out the following hands-on assignment in Matlab

1. Simulate the model given in Equation (2.3) with
 - x containing a constant and one further variable distributed as $N(0,5)$
 - $\theta = [2, 5]'$
 - e_{it} is distributed as $N(0,1)$
 - $N=100$
 - $T=5$
2. Obtain starting values for the maximum likelihood (ML) maximization via running a POLS regression of the model given in Equation (2.3).
3. Estimate the coefficient vector θ in Equation (2.3) via ML (the likelihood is given in Equation 2.7).
4. Calculate the asymptotic variance of the estimated parameter vector.
5. Observe what happens to the t-values of the estimated parameters if (i) you change the number of observations, N or T , or, (ii) increase the variance of the error term.
6. To find out whether the ML estimation yields unbiased results run a Monte Carlo Simulation with 1000 replications and calculate the mean of each estimated parameters.