Econometrics II
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Exercise Session 3

Problem 1: Properties of Within Estimator

Consider the following panel data model:

$$Y_{it} = X_{it}'\beta + u_i + \epsilon_{it}, \quad E[X_{is}\epsilon_{it}] = 0 \; \forall s = 1, ..., T$$

1. Discuss finite sample properties of the within estimator
2. Derive the asymptotic variance of the within estimator and discuss a suitable estimator for it.

Problem 2: Conditional Logit with Fixed Effects

Consider the following binary choice panel model with T periods:

$$Pr\{y_{it} = 1|x_{it}\} = \Lambda(x_{it}\beta + \mu_i), \qquad i = 1, \ldots, N, t = 1, \ldots, T$$

where

- Λ is the logistic CDF,
- y_{it} is an indicator whether individual i decides to buy a product in period t,
- x_{it} is the income of individual i in time period t,
- μ_i is the individual fixed effect.

Discuss how you would estimate the model without making an assumption of independence between individual fixed effects μ_i and x_{it}.