

Midterm test for ‘Panel Data’

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1. A linear panel regression model should be estimated. Time and individual effects may play a role but you are not sure whether these are fixed or random effects. The only available estimation routine is OLS.
 - (a) Describe how you could proceed if you consider the effects as fixed;
 - (b) Suppose you consider the effects as random but you nonetheless use the procedure you described in (a). Can this approach be justified?
 - (c) You apply some poolability tests. Individual effects are supported over a fully pooled model, though you are unable to reject the one-way model against the two-way model. If you are given the information that a Hausman test rejects its null, should you purchase a program that offers to estimate one-way random-effects models?

2. Assume a panel model with individual random effects and fixed time effects:

$$\begin{aligned}y_{it} &= X'_{it}\beta + \lambda_t + u_{it}, \\u_{it} &= \mu_i + \nu_{it}.\end{aligned}$$

- (a) Its BLUE estimator can be written in the form $(\mathbf{C}'\Omega^{-1}\mathbf{C})^{-1}\mathbf{C}'\Omega^{-1}y$. Give a short description of the matrices \mathbf{C} and Ω , including all matrix dimensions;
 - (b) Provide the inverse matrix Ω^{-1} .
3. Panel data are used to investigate the dependence of aggregate happiness in 50 countries on covariates such as average age, per capita income, and average health status. How would you interpret time effects and individual effects in this model? Would you expect a country with a high per capita income to show a large individual effect?