ECON 5350 Midterm Exam

Spring 2008

Panel Data (100 pts). Consider the following panel data model

$$y_{i,t} = \alpha_i + x'_{i,t}\beta + \epsilon_{i,t}$$

where $i = 1, ..., n$, $t = 1, ..., T$ and one of the following four assumptions hold:

- α_i is an unknown parameter and $\epsilon_{i,t} \sim i.i.d.(0, \sigma^2_\epsilon)$.
- α_i is an unknown parameter and $\epsilon_{i,t} = \rho_i \epsilon_{i,t-1} + \nu_{i,t}$, where $\nu_{i,t} \sim i.i.d.(0, \sigma^2_\nu)$.
- α_i is a random variable with mean α and $\epsilon_{i,t} \sim i.i.d.(0, \sigma^2_\epsilon)$.
- α_i is a random variable with mean α, freely correlated across i, and $\epsilon_{i,t} \sim i.i.d.(0, \sigma^2_\epsilon)$.

For each of the four cases above, write out the full variance-covariance matrix of the errors and outline an estimation strategy that will produce consistent and asymptotically efficient estimates of β.