

Economics 620 Midterm
Spring, 2008

Professor N. M. Kiefer
Cornell University

TA Jae Ho Yun

You may use your books and notes but may not collude or use cellphones, Blackberries, other pda's, PC's etc. All questions have equal weight. Do them all if possible. Econometrics is fun. Some interesting constants: $\sqrt{2}$ =Pythagoras' number ≈ 1.41421 ; Euler's $\gamma = -\int_0^\infty \ln(x)e^{-x} dx \approx 0.577$; Ω such that $\Omega e^\Omega = 1 \approx 0.56714$. Good luck!

1. (Warmup) For the regression model $y_i = \alpha + \beta x_i + \epsilon_i$ with $\epsilon_i \sim N(0, \sigma^2)$ and $E\epsilon_i\epsilon_j = 0$ for $i \neq j$ give the F, Score, Wald and Likelihood Ratio statistics for testing $H_0 : \alpha = 0$.
2. For the regression model $y_i = \alpha + \beta x_i + \epsilon_i$ with $x_i \in \{0, 1\}$ (binary), $\Pr(\epsilon_i = -1) = 2/3$, $\Pr(\epsilon_i = 2) = 1/3$ and $E\epsilon_i\epsilon_j = 0$ for $i \neq j$ a) is the OLS estimator unbiased? BLUE? b) Give a better estimator. c) Explain briefly but intelligently.
3. A colleague comes to you for advice on estimating the model $y_i = \beta x_i \epsilon_i$ with $x_i > 0, \beta > 0, f(\epsilon_i) = \text{Exp}(-\epsilon_i)$ and the ϵ_i independent. a) He suggests bringing this into a linear regression form by taking logs. How can you use this approach to obtain a consistent estimator for β ? b) Obtain the MLE for β and give an expression for its asymptotic variance.