Econ 620 – Spring 2007

Instructor: Professor Kiefer
TA: Jae Ho Yun

Midterm

You may use your books and notes but may not collude or use cellphones, pda's etc. All sections have equal weight. Econometrics is fun. Good luck!

1. You are intersted in the regression model $Ey = X\beta$ and you have n independent observations on y and X. You can calculate the OLS estimator $\widehat{\beta}$. However, you are pretty sure the true value of β is near β_0, so you decide to use this information by generating n_0 "observations" $y^* = X^*\beta_0 + \epsilon^*$, where X^* consists of the first n_0 rows of X and ϵ^* is $N(0, I_{n_0})$. You then combine these observations with the original data set and calculate the overall OLS estimator $\widetilde{\beta}$. What are some properties of $\widetilde{\beta}$? a) is $\widetilde{\beta}$ linear (in y)? b) is $\widetilde{\beta}$ unbiased? c) Whta is the sampling varance of $\widetilde{\beta}$? (compare with $V(\widehat{\beta})$). f) (Harder, but if you do this first, the others follow) Write $\widetilde{\beta}$ as $A\widehat{\beta} + B\beta_0 + C\epsilon^*$, where A, B and C are matrices.

2. For the regression model $Ey = \beta_0 + \beta_1 x_1 + \beta_2 x_2$ with iid normal observations, you are mainly interested in the parameter $\gamma = \beta_1^2 + \beta_2$. a) Give an estimator $\widehat{\gamma}$ for γ(the notation is a hint). b) What is the asymptotic distribution of $\widehat{\gamma}$? c) How would you test the hypothesis that $\gamma = 0$? d) Compare the score (LM) and Wald tests. Which is easier? e) (harder) compare the tests when $\beta_1 = \beta_2 = 0$.