Problem set 5

August 4th, 2011
due August 8th, 2011

Question 1

The following table presents the results from OLS regression where dependent variable is the number of times arrested (standard errors are in parentheses below the estimates, N=200).

Assume all relevant assumptions are satisfied.

(a) For the first specification, perform two-tailed test at the 5 percent and 1 percent significance levels for the null hypothesis that the proportion of convictions from prior arrests has no impact on the number of times arrested.

(b) Perform an F-test for the null hypothesis that income and unemployment duration jointly have no impact on the number of times arrested.

(c) Construct a 0.95 confidence interval for the parameter on the proportion of convictions from prior arrests in the second specification.

(d) For both specifications carry out an F-test for significance of the model at the 5 percent level.

	specification 1	specification 2
proportion of convictions from prior arrest	-0.1593	-0.1609
	(0.415)	(0.0408)
average sentence length (months)	0.0076	0.0032
	(0.0047)	(0.0046)
income (hundred dollars)		-0.0024
		(0.0003)
unemployment duration		0.0032
		(0.0037)
constant	0.4566	0.5827
	(0.0244)	(0.0292)
R^2	0.0062	0.042

Question 2

Use Stata and the data set lawsch85.dta to help answer this question. The data set contains 144 observations on 21 variables. The variables of interest are $lsalary$ (log of median starting salary, s_i), LSAT (median LSAT score, ls_i), GPA (median college GPA, g_i), $llibvol$ (number of volumes in library, measured in thousands, v_i), $lcost$ (log of law school cost, lc_i), $rank$ (law school ranking, r_i), $clsize$ (size of entering class, cl_i, and $faculty$ (numbers of faculty, f_i).

Consider the following model, which aims to evaluate the factors affecting the starting salary of new law school graduates:

$$l(s_i) = \beta_0 + \beta_1 ls_i + \beta_3 g_i + \beta_3 v_i + \beta_4 lc_i + \beta_5 r_i + u_i$$

(a) State and test the null hypothesis that the ranks of law schools has no effect on median starting salaries (holding everything else constant).

(b) Are features of the incoming class of students (in this model college GPA and LSAT score) individually or jointly significant for explaining the median starting salary?

(c) Perform a *single* test to see whether the size of the incoming class and number of faculty need to be added to the model.

Question 3* and 4* (more difficult, optional)

3. Suppose the population regression function is specified to be: $C = \beta_0 + \beta_1 Y + \beta_2 A + \beta_3 YA + u$ where C is consumption, Y is income and A is age. Explain how you would test the hypothesis that the marginal propensity to consume does not depend on age.

4. Suppose you believe that the CNLR model applies to $y = \beta_0 + \beta_1 x + u$, but you suspect that the impact of x on y depends on the value of another variable w. Explain how you would test for this.