

# Economics 8205-8206: Applied Econometrics I

**Instructor: Professor Gautam Gowrisankaran**  
**Teaching Assistant: Mehmet Ozhabes**  
**University of Minnesota, Fall Semester 2000**

## Assignment 3

Handed out: October 10, 2000

Due: October 19, 2000

### Non-computer problems

1) Greene, Chapter 7, p. 312, problems 1 and 2.

Note that Greene's definition of  $R^2$  is the same as our definition of  $R_c^2$ .

2) Restricted regression.

a- Suppose that you want to estimate the coefficients from a model:  $y = X\beta + u$  s.t.  $R\beta = r$ . Solve for the restricted least-squares estimates of  $\beta$  using a Lagrangian.

b- Greene, Chapter 7, p. 313, problem 7.

3) Greene, Chapter 7, p. 315, problem 16.

### Computer problems: turn in your source code and results

Use the Matlab data set `assig3_pr3` for this problem.

4) Consider the model  $y = X_1\beta_1 + X_2\beta_2 + X_3\beta_3 + X_4\beta_4 + u$  s.t.  $\beta_3 = \beta_1\beta_2$ .

a- Explain why you cannot estimate this model using OLS, and show how to estimate the model using NLS.

b- Estimate the model using NLS. Find parameter estimates and confidence intervals for all parameters.

c- Estimate the model using D&M's linear one-step efficient estimation, p. 196. Compare your estimates to those from b.

d- Perform a LR-type test that  $\beta_4 = 0$ .

Use the Matlab data set `assig3_pr4` for this problem.

5) Consider the model  $y = X_1\beta_1 + X_2\beta_2 + X_3\beta_3 + X_4\beta_4 + X_5\beta_5 + u$ .

a- Perform a Wald test that  $\beta_1 + 2\beta_2 = 3$  and  $\beta_3 = 0$ .

b- Perform a LM test of the same restrictions. Using  $s^2$  in this test, show that the tests are numerically identical.