Economics 8205-8206:
Applied Econometrics I

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Assignment 6

Handed out: November 30, 2000
Due: December 12, 2000

Non-computer problem

1) Identification in simultaneous equations models
Greene, Chapter 16, p. 710, problem 1.

Computer problems: you must turn in your source code and results

2) Maximum likelihood estimation: Use data set assig6_pr2 for this problem.
Consider the following two equation model with endogenous y's and exogenous x's:

$$y_{1t} = \alpha y_{2t} + \beta_1 x_{1t} + u_{1t}$$
$$y_{2t} = \alpha y_{1t} + \beta_2 x_{2t} + \beta_3 x_{3t} + u_{2t} .$$
$$\begin{pmatrix} u_{1t} \\ u_{2t} \end{pmatrix} \sim N\left(0, \begin{matrix} \sigma_1^2 & 0 \\ 0 & \sigma_2^2 \end{matrix}\right)$$

You will be sent a Matlab data set that contains 50 time series observations and 5 variables in the order: $(y_{1t}, y_{2t}, x_{1t}, x_{2t}, x_{3t})$. Write down the likelihood function $L(y_{1t}, y_{2t} | \alpha, \beta_1, \beta_2, \beta_3, x_{1t}, x_{2t}, x_{3t})$. Find the maximum likelihood estimates and the estimated variance/covariance matrix.

3) Instrumental variables estimation. Use the same data set assig6_pr2 for this problem.
Estimate the model: $y_{1t} = \alpha y_{2t} + \beta_1 x_{1t} + u_{1t}$.
a – Estimate this model via instrumental variables. Find estimates and standard errors for the parameters (α, β_1). Compare to the results from problem 2.
b – Estimate your model via 2SLS. Find estimates and standard errors for the same parameters. Compare to the results from problems 2 and 3a.