Economics 421 Final Exam

Summer Session 1997

Answer each of the following questions.

1) Econometric models are described as stochastic rather than deterministic. The stochastic nature of the models comes from the error term which we have labeled ϵ. Describe the sources of this error term. (15 points)

2) Suppose the model is $Y_i = a + X_i b_1 + Z_i b_2 + e_i$ where
$e_i = g + e_{i-1} + X_i v_i$, and v_i satisfies all the usual assumptions we make about the error. Which, if any, of the error or model assumptions are violated by the model? (21 points)

3) Suppose you are given the three equation model:

$$Y_1 = a_0 + a_1 X_1 + a_2 Y_2 + a_3 Y_3 + u_1$$

$$Y_2 = b_0 + b_1 X_2 + u_2$$

$$Y_3 \equiv X_1 + X_3 + Y_1$$

where Y's are endogenous variables and X's are predetermined or exogenous variables. Assume that $E(u_1 u_2) = 0$. Why does this assumption matter? Find the reduced form equations and, if possible, the structural parameters. Describe how you would estimate the first two equations. (20 points)

4) Your estimate of a quarterly consumption model on 50 observations is:

Consumption = -48.7 + .68Income - .04intrate
(17.3) (.23) (.02)
R^2 = .75, dw = 3.75

Numbers in parentheses are standard errors. Test for statistical significance of the slope coefficients. Test the hypothesis that the income coefficient equals .9. Is autocorrelation present? What is the magnitude of the correlation between the errors? Does this seem sensible? If autocorrelation is present what can be said about the results of the estimation? (18 points)

5) Specification errors often show up as either autocorrelation or heteroskedasticity. Explain. (10 points)

6) You formulate a distributed lag model $Y_t = a + b_0 X_t + b_1 X_{t-1} + b_2 X_{t-2} + b_3 X_{t-3} + u$. You believe that the effect of X is small at first, rises, then declines. Describe how you would estimate this model and what issues you must face. (14 points)

7) You believe that the demand for telephone service varies by season of the year. Explain how you would test this hypothesis. (10 points)