SIMON FRASER UNIVERSITY
Department of Economics
ECONOMICS 435

Spring 1991 Final Examination M. Kamstra

Each question worth 20%. Exam 3 hours in duration.

Section 1 : Do all of the following 3 questions

1) Short Answer: Explain briefly each of the following, and give an example if appropriate.

a) Population characteristics and sample analogues
b) BLUE
c) Post-sample test (Chow's short test)
d) Type I and Type II errors
e) Maximum Likelihood estimation
f) Feasible Aitken procedure
g) Simultaneity

2) Present an appropriate (a) methodology or procedure for performing statistical inference in econometrics in the context of a standard linear regression model with normal "white noise" error terms. Then explain how your test procedure or inferences are (b) affected by:

(i) multicollinearity.
(ii) presence of a lagged dependent variable.
(iii) nonlinear restrictions on the regression coefficients.
(iv) presence of simultaneity.
(v) presence of autocorrelation.

3. A study was conducted to assess the influence of various factors on the start of new firms in the electronics components industry in New York. With twenty years of data the following model was estimated:

$$\underset{}{y_t} = -59.31 + \underset{(.13)}{.81\, y_{t-1}} + \underset{(1.156)}{4.983 x_{t,1}} + \underset{(.210)}{2.1983 x_{t,2}} + \underset{(2.063)}{3.816 x_{t,3}} - \underset{(.330)}{.310 x_{t,4}} - \underset{(3.055)}{.886 x_{t,5}} + \underset{(1.568)}{3.21 x_{t,6}} - \underset{(.354)}{.085 x_{t,7}}$$

$R^2 = .766$, DW-statistic $= .1$

where

y = New business starts in the industry
x_1 = Population, in millions
x_2 = Industry size
x_3 = Measure of economic quality of life
x_4 = Measure of political quality of life
x_5 = Measure of environmental quality of life
x_6 = Measure of health and educational quality of life
x_7 = Measure of social quality of life

The figures in parentheses beneath the coefficient estimates are their estimated standard errors.

Discuss critically and evaluate this set of empirical results.

Section 2 : Do any 2 of the following 3 questions

4) What is meant by a dummy variable and how is it used in regression analysis? What is meant by an Almon polynomial lag structure, why might we use it, and what are some drawbacks of it.

5) Consider the following set of equations:

$$\begin{aligned}
\gamma_{1,1}\, y_1 + \gamma_{1,2}\, y_2 + \gamma_{1,3}\, y_3 &= \beta_{1,1}\, x_1 + \varepsilon_1 \\
\gamma_{2,1}\, y_1 + &= \beta_{1,2}\, x_1 + + \beta_{2,3}\, x_3 + \varepsilon_2 \\
\gamma_{3,1}\, y_1 + \gamma_{3,2}\, y_2 + &= \beta_{1,3}\, x_1 + \beta_{3,2}\, x_2 + \beta_{3,3}\, x_3 + \varepsilon_3
\end{aligned}$$

where the Y's are endogenous variables and the X's are exogenous variables.

a) What is meant by the "identification problem"? Discuss the identifiability of each equation above.
b) Describe a method you would use to estimate the first equation above.
c) Why might one wish to estimate a reduced form versus a structural equation?

6) What do we mean by the general linear regression model (i.e. what differentiates it from the classical linear model)? Show that the OLS estimator is consistent even if we should be using the GLS estimator, and explain why the GLS estimator is "better".