Applied Econometrics Exam 2006

2 hours

Answer 2 questions

Question 1

Consider the model:

$$y_{it} = x_{it}^{'}\beta + \varepsilon_{it}$$

where the index *i* refers to the industry and *t* to time, with:

$$\varepsilon_{it} = \alpha_i + \eta_{it}$$

where α is an industry specific error term and cov(η, x)=0 for all *i,t*.

a) Explain the problems of estimating this model as OLS. (20%)
b) Consider the assumptions that α is uncorrelated with the regressors and that α is an industry-specific stochastic disturbance, independent of time, and assumed to be uncorrelated across industries, or with the η term. What models do these imply and what are their statistical properties? (20%)
c) The following results are for a growth model estimated using panel data for the 45 industries in South Africa, where the dependent variable is the growth of value added in production for each industry. A dummy variable for the twelve defence related industries was also employed to capture the differences between military and non-military government spending effects.

Panel Data Estimation Results

Period	1973-93	
	Coeff	t ratio
Employment growth	**0.56**	13.4
K stock growth	**0.10**	2.7
Govt growth * (G/Y)	**0.13**	1.9
Govt growth	-0.00	0.5
Defence related dummy	0.01	0.6
Constant	**0.14**	30.8
R squared	0.25	
Chi-squared (5)	**310.4**	

These results are for the random effects model. Explain how they would have been estimated and briefly discuss what the results tell you. (20%)

d) Explain how you would test the random effects model against the fixed effects. (20%)

e) Briefly explain why random effects models are usually estimated using a feasible GLS procedure. (20%)

Question 2.

Consider the following model:

$$y_{it} = \alpha_i + \beta_i' x_{it} + \lambda_i y_{it-1} + \varepsilon_{it}$$

with $t = 1,\ldots, T$ and $i = 1,\ldots, N$

a) Discuss the estimation of both the long run and the short run coefficients of this model using a simple fixed effects procedure. (40%)

b) Discuss how you might estimate this model if T is small and N is large. (30%)

c) Discuss possible heterogeneity bias and how you might estimate the model to deal with it if T is large and N is large.(30%)

Question 3.

a) Explain the Law of proportionate effects and discuss how you might operationalise it and the econometric issues involved. (40%)

b) Discuss how Dunne and Hughes (1992) tested the ‘ law of proportionate effects’ for a sample of UK quoted companies and dealt with the econometric problems. (30%)

d) Explain in detail how possible 'sample selection bias' can be dealt with within this context. (30%)

Question 4

a. Briefly explain what a cointegrating VAR model is and how you might estimate it. (50%)

b. Birdi and Dunne (2001) consider a log linear relationship based upon a simple Cobb Douglas model:

$$q = a + \alpha k + \beta l + \gamma m$$

Where q is output, k is capital, l is labour and m is military spending, all in logs and all constant proces. Treating this within a VAR estimation framework within Microfit 4.1 (Pesaran and Pesaran,

1997) and starting from an order 4 VAR we get a VAR (2) as the optimal lag length. The order of the VAR is found to be 2 and unrestricted intercepts and no trends gives one cointegrating vector

$$\underset{}{qm} = \underset{(0.7)}{1.32\,k} - \underset{(2.1)}{1.53\,l} + \underset{(0.5)}{0.50\,m}$$

The underlying ECM model is:

$$\Delta qm_t = \underset{(1.7)}{1.96} + \underset{(3.6)}{0.55\,\Delta qm_{t-1}} + \underset{(2.0)}{1.23\,\Delta k_{t-1}} - \underset{(1.6)}{0.84\,\Delta l_{t-1}} - \underset{(1.3)}{0.08\,\Delta m_{t-1}} + \underset{(1.6)}{0.16\,ECM_{t-1}} - \underset{(2.3)}{0.04\,DS}$$

So in this case military spending has a negative short run effect on growth.

i. Explain what they have done and why this approach might be an improvement over simply estimating the aggregate production function? (30%)

ii. Interpret and critically evaluate the results. (20%)

Question 5.

Deaton and Muellbauer (1980) estimate the following demand equation for clothing as the second part of an 8 commodity group Almost Ideal Demand System for the UK, 1954 - 74.

$$w_{1t} = \underset{(-3.1)}{-0.48} + \underset{(1.8)}{0.03\,P_{1t}} + \underset{(1.0)}{0.02\,P_{2t}} - \underset{(-1.6)}{0.02\,P_{3t}} - \underset{(-1.5)}{0.03\,P_{4t}} - \underset{(-3.3)}{0.03\,P_{5t}}$$

$$+ \underset{(0.6)}{0.01\,P_{6t}} + \underset{(1.6)}{0.03\,P_{7t}} - \underset{(-2.2)}{0.05\,P_{8t}} + \underset{(3.7)}{0.09\,(lnX_t - lnP^*_t)}$$

SE($x10^{-2}$) = 0.106 R^2 = 0.984 DW = 2.29 t ratios in brackets

where: P_{it} is the log of the price of the i^{th} commodity

w_{1t} is the expenditure share of food

X_t is total expenditure

$1n\,P^*_t$ $= \Sigma\ w_{1t}\,P_{it}$ which is the Stone price index.

a.

i) Interpret this regression. (20%)

ii) Explain what restrictions would be expected to hold for this equation and for the system as a whole. (20%)

iii) Explain how you would test homogeneity and symmetry on this system. (20%)

b. Critically evaluate the different approaches used by Anderson and Blundell (1982) and Dunne, Smith and Pashardes (1984) to provide a dynamic form of the Almost Ideal demand system. (40%)