LAND ECONOMY TRIPOS Part IA
LAND ECONOMY TRIPOS Part IB

Monday 24 May 2010 09.00 - 12.00

Paper 3

ACCOUNTING AND DATA EVALUATION

Answer **five** *questions*

Section A *has six questions, of which you are to answer* **four.** *You must answer each subpart of each question you choose.* **Section B** *has two questions, of which you are to answer* **one.**

Section A *will be* **weighted two-thirds** *of the final mark for this examination and* **Section B** *will be* **weighted one-third** *of the final mark for this examination.*

Unless otherwise stated each part of each question carries equal weight.

An answer to each section must be tied up separately with its own cover sheet.

A copy of the statistical tables is on your desk together with a list of statistical formulae.

An approved calculator may be used.
Graph paper is supplied.

Candidates should show all workings or annotate their answers in the exam booklet. Any loose sheet workings should be attached.

You may not start to read the questions printed on the subsequent pages of this question paper until instructed that you may do so by the Invigilator

Section A

1.

a) A researcher wishes to assess whether, for final year undergraduates, the University attended makes a significant difference to the number of job offers received. To do so, she collects the following data on number of job offers for two random samples of final year undergraduates, one from the University of Cambridgeshire and one from the University of Oxfordshire:

University of Cambridgeshire	University of Oxfordshire
12	8
10	5
6	9
9	4
15	6
12	
14	

Based on this data, can the researcher conclude that the University attended makes a significant difference to the number of job offers received? Use a two-tailed test with $\alpha = 0.05$. **(9 marks)**

b) Outline potential sources of bias which might affect the validity of the researcher's conclusion drawn in part (a). **(2 marks)**

c) A firm of estate agents is interested in finding out whether an innovative new training course will successfully increase the number of property sales made by its employees. It therefore decides to undertake a trial by randomly selecting a sample of employees from across its branches and sending them on the course. For each employee, the firm then compares the number of property sales made in the six-month period following the course with the number of sales made in the six-month period prior to the course. The data collected is as follows:

Employee	A	B	C	D	E	F	G
Before	0	0	3	3	2	0	0
After	4	0	14	23	9	8	6

Given this data, what would the firm conclude about the effectiveness of the training course? What is the effect size of the training course on employee property sales? **(9 marks)**

2.

a) A researcher wishes to assess whether the number of days worked per year differs between US- and UK-based workers of a large multinational. To do this, she surveys 9 workers from each country matching them according to job position, age and number of children. The data she obtains for number of days worked in 2009 are as follows:

Matched pair	No. of days worked	
	UK	US
A	145	145
B	185	187
C	119	130
D	140	155
E	140	152
F	115	112
G	111	120
H	199	208
I	159	167

Based on this data, would the researcher be able to conclude that the number of days worked differs significantly between the two countries at the 5% significance level? **(8 marks)**

b) Suppose that the Curriculum Vitae (CVs) of one in four of all UK job applicants contain at least one factually incorrect statement about their qualifications and job history. If a randomly selected employer receives 48 applications for an advertised vacancy, what is the probability that:

i) More than 18 of the applicants have misleading statements on their CVs?

ii) At least 18 of the applicants have misleading statements on their CVs? **(7 marks)**

c) A researcher wishes to use Ordinary Least Squares (OLS) on cross-country data to estimate the following demand function for a country's exports:

$$X_i = AP_i^{-\eta}(PF_i^{\delta})Z_i^{\varepsilon}$$

where X_i = country i's volume of exports
P_i = average price of country i's exports
PF_i = average price of exports for countries which compete with country *i*
Z_i = level of income in country i's primary exports markets

Question 2 continued

i) Transform the demand function into an equation which can be estimated using the OLS method and specify the corresponding sample regression function.

ii) In this transformed function, how should the researcher interpret an estimated value of the parameter ε equal to 0.5 (i.e. $\hat{\varepsilon} = 0.5$)?

(5 marks)

3. Inspired by the idea of the Keynesian consumption function, a third-year Land Economy undergraduate wishes to investigate, as part of her dissertation, the relationship between weekly expenditure on consumption and weekly personal disposable income. To do so, she collects the following data for a random sample of 12 households:

Household	Weekly consumption expenditure (£)	Weekly personal disposable income (£)
1	55	80
2	65	100
3	74	105
4	90	125
5	98	130
6	102	140
7	115	180
8	130	185
9	144	225
10	145	240
11	192	245
12	220	265

Perform a regression analysis to assess the relationship between weekly consumption expenditure and weekly personal disposable income.

(20 marks)

4.

a) The government is interested in assessing whether there is any difference in waiting times between regions A and B for patients with heart disease to see a heart specialist. For a sample of four patients in each region, it collects the following data on waiting times:

	Waiting time (days)			
Region A	38	35	44	35
Region B	29	32	33	26

Question 4 continued

i) Calculate a 90% confidence interval estimate of the mean difference in waiting times between the two regions.

ii) Is it is reasonable to conclude that the region in which a patient lives makes a difference to the waiting time experienced?

(6 marks)

b) A professor in spatial economics claims that unemployment rates across UK regions tend to exhibit remarkable persistence over time, so that a region's past unemployment rate provides an excellent indication of its likely future unemployment rate. In an attempt to back up this claim, he collects the following data on unemployment rates for regions of England:

Region	**2003 unemployment rate (%)**	**2007 unemployment rate (%)**
North East	6.2	6.6
North West	5.0	6.0
Yorkshire & the Humber	5.2	5.7
East Midlands	4.3	5.1
West Midlands	5.8	7.1
East	4.0	4.8
London	7.4	7.5
South East	4.0	4.3
South West	3.5	4.1

i) Is the professor correct? Is there a significant correlation between regional unemployment rates across different years?

ii) Given your answer to part (i), what is the accuracy with which the professor will be able to use a region's unemployment rate in 2003 to predict its unemployment rate in 2007? **(6 marks)**

Question 4 continued

c) A researcher is interested in using hypothesis testing to assess whether or not a government programme to improve health outcomes in lagging rural regions of a developing country has been effective. The program works by providing small monetary payments to eligible families whose members regularly attend a local clinic which provides health and nutritional advice. If the members of a family do not attend, the household receives no payment.

i) Briefly explain the logic of hypothesis testing.

ii) Describe the different approaches which the researcher may adopt in designing her research study, comparing and contrasting the strengths and weaknesses of these approaches in the process. Discuss any additional problems in satisfying the assumptions of hypothesis testing which the researcher may face in designing her study. **(8 marks)**

5.

a)

i) What do we mean by the "statistical power" of a test?

ii) What factors affect the statistical power of a hypothesis test and how precisely do they affect the power? **(4 marks)**

Question 5 continued

b) A researcher is interested in analysing the relative resilience of expenditure on luxury items during an economic downturn for households living in two different regions of the country. The researcher has data on average weekly expenditure on luxury items from a survey that was conducted prior to the downturn by another researcher (this survey was originally carried out for other purposes). This data covers a sample of ten households in each region. Following the onset of the downturn, the researcher conducts her own survey of households in the same regions to collect further data on average weekly expenditure on luxury items. Combining the data from both surveys gives her the following data set:

	Average weekly expenditure on luxury items (£)	
	Prior to downturn	During downturn
Region A	27	15
	26	20
	19	14
	27	19
	21	13
	25	21
	23	18
	24	21
	26	24
	19	17
Region B	24	29
	28	27
	23	22
	25	20
	21	28
	26	22
	29	25
	27	20
	22	29
	25	21

Assuming that the households surveyed after the onset of the downturn are different from those that were surveyed prior to the downturn, conduct a two-factor ANOVA to analyse these data.
(16 marks)

6.

a) In a raffle, there are 400 prizes which are worth £10 each in value, 40 prizes which are worth £50 each in value and 4 prizes which are worth £500 each in value. Overall, 2000 raffle tickets are sold.

i) Using probability, calculate the expected value of one raffle ticket.
ii) If the organisers of the raffle draw the winning tickets at random, what is the probability that the second winning ticket drawn is for a

prize of £500? **(3 marks)**

(TURN OVER)

Question 6 continued

b) Consider the following data on points accumulated by football team in the Scottish Premier League table as of 4th February 2010:

Team	**Points accumulated**
Rangers	54
Celtic	44
Hibernian	42
Dundee United	39
Motherwell	30
Hearts	28
Aberdeen	27
St Johnstone	23
St Mirren	20
Kilmarnock	19
Falkirk	17
Hamilton	17

i) Describe the shape of the distribution of points accumulated.

ii) Calculate the semi-interquartile ratio for the number of points accumulated.

iii) Transform the distribution of points into a standardised distribution with a mean of 100 and a standard deviation of 10. **(10 marks)**

c)

i) What assumptions must hold true for the method of Ordinary Least Squares (OLS) to be appropriately applied?

ii) In conducting a "specification search" in regression analysis, why is it inappropriate to use the unadjusted coefficient of determination (R^2) to guide this search? **(7 marks)**

Section B

7. Below is the trial balance of Schmars Bars Ltd as at 31.12.09:

	£000	**£000**
Share Capital		200
Profit and Loss b/f 31.12.08	23	
General Reserve		15
Land and Buildings	145	
Motor Vehicles	54	
IT equipment	35	
Motor Vehicles Accumulated Depreciation		32
IT equipment Accumulated Depreciation		7
Stock 31.12.08	19	
Cash		1
Sales		55
Purchases	30	
Provision for doubtful debts		10
Salaries and wages	30	
Administration costs	5	
Interest	1	
Advertising costs	15	
Debtors	3	
Creditors		40

i) Stock at 31.12.09 was £25,000

ii) Depreciation should be charged as follows:
Motor Vehicles 25% of cost
IT equipment 20% of cost

iii) The provision for doubtful debts should be £1,000

iv) A vehicle is sold during the year for £4,000
Its NBV is £ 7,500 and accumulated depreciation charged on it is £2,500

v) Audit fees are £1,000

a) After making the necessary year-end journal adjustments, prepare the Income Statement and the Balance Sheet for 2009. **(15 marks)**

b) Comment on the performance of Schmars Bars Ltd, basing your analysis on the financial statements which you produced in your answer to part (a). **(5 marks)**

8. Answer **three** questions from the following **(all questions carry equal marks)**

   a) Why are the fundamental accounting concepts so important?

   b) Discuss the extent to which ratio analysis is useful in assessing the health of a business.

   c) Why is an audit necessary, and who benefits from the audit process?

   d) Discuss the gearing decisions a real estate company might make.

   e) Discuss the impact of the conversion to Real Estate Investment Trust (REIT) status on the accounts of a company whose main business is the ownership and management of investment property.

END OF PAPER