淡江大學96學年度碩士班招生考試試題

系別：產業經濟學系　　科目：計 量 經 濟 學

准帶項目請打「V」	
V	簡單型計算機

答題須知：如需計算之題目請詳細寫出計算過程，而假設檢定所需之臨界值表列於試題第 2 頁。

1. 為了檢查淡江產經所畢業學生就業的薪資是否存在性別的差異，A 同學蒐集了近 100 位畢業學長姊的資料，擬進行以下的迴歸分析：

$$Y_i = \beta_1 + \beta_2 X_i + \beta_3 D_i + u_i$$

其中 Y=每月薪資(千元)， X=畢業年數，而 D 為性別的虛擬變數(Dummy variable)

(a) (3 分) 請問你如何設定此一虛擬變數？

(b) (10) 若估計結果顯示 $\hat{\beta}_3 = 2.75$，$s.e.(\hat{\beta}_3) = 0.77$。請根據你在(a)的設定下解釋此一估計結果的經濟意義並檢定此係數是否顯著的異於 0。($\alpha = 0.05$)

(c) (3 分)若你懷疑除了基本薪資的差異外，男女性的年資對月薪的影響也不一樣，請說明你將如何改寫以上迴歸式？

(d) (4 分) 承(c)題若你所改寫的迴歸式中新添的解釋變數前的係數為 β_4，而各係數的估計值分別為 $\hat{\beta}_1$=31.5，$\hat{\beta}_2$=1.15，$\hat{\beta}_3$=1.05，$\hat{\beta}_4$=2.10。根據此估計結果請問每增加一年年資男性月薪比女性月薪多(少)多少錢？

2. Consider the following wages-productivity regression for the United States for the period 1959-1998

$$\ln \hat{Y} = 1.5239 + 0.6716 \ln X_t$$
$$s.e. \quad (0.0762) \quad (0.0175) \qquad R^2 = 0.9747 \quad DW = 0.1542$$

Where X=index of output per hour (1992=100) and Y=index of real compensation per hour (1992=100)

(a) (5 分)There could be an autocorrelation problem in the above estimation. Which assumptions of classical linear regression model (CLRM) have been violated when this problem did occur?

(b) (10 分) Is there positive or negative first order autocorrelation in this estimation? Please show your hypothesis testing. ($\alpha = 0.05$)

(c) (10 分)What is the remedial measure for this problem?

3. In a regression of research and development expenditure (RD) on sales (S) for 22 industry groupings in Taiwanese manufacturing industry, the following regression results were obtained:

Regression (1)
$$\hat{RD}_i = 192.9931 + 0.0319 S_i$$
$$s.e. \quad (533.9317) \quad (0.0083) \qquad R^2 = 0.4783$$

Regression (2)
$$\left(\frac{\hat{RD}}{\sqrt{S}}\right)_i = -246.68\frac{1}{\sqrt{S_i}} + 0.0319\sqrt{S_i}$$
$$s.e. \quad (381.1285) \quad (0.0071) \qquad R^2 = 0.3648$$

(a) (5 分) Going from regression (1) to regression (2), the researcher seems to worry about the problem of heteroscedasticity. Which assumptions of classical linear regression model (CLRM) have been violated when this problem did occur?

(b) (10 分) What assumption is made by the researcher about the nature of heteroscedasticity? Can you justify it?

(c) (5 分) Compare the results of these two regressions. Has the transformation of the original model improved the results? Why or why not?

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4. Consider the following wage-determination equation for the British economy for the period 1950-1969:

$$\hat{W}_t = \beta_1 + \beta_2 V_t + \beta_3 X_t + \beta_4 M_t + \beta_5 M_{t-1} + u_t$$

Where W = hourly wages and salaries per employee (unit: pounds)

V = unfilled job vacancies in Great Britain as a percentage of the total number of employees in Great Britain. (unit:%)

X = gross domestic product per person employed (unit: pounds)

M_t = Import prices (unit: pounds)

M_{t-1} = import prices in the previous year. (unit: pounds)

The estimate result is as follows:

$$\hat{W}_t = 1.073 + 5.288 V_t - 0.116 X_t + 0.054 M_t + 0.046 M_{t-1}$$
$$se \quad (0.797)(0.821) \quad (0.111) \quad (0.022) \quad (0.019)$$
$$R^2 = 0.934 \qquad df = 14$$

(a). (10 分) Please interpret the slope terms of the preceding equation.

(b). (5 分) If the average hourly wage rate $\bar{W} = 3$ pounds, and the average current import price $\bar{M}_t = 1.5$ pounds. Please compute the elasticity of wages and salaries per employee with respect to the current import prices.

(c). (10 分) If the estimated covariance between β_4 and β_5 is 0.00015. Please test the hypothesis that the impacts of current import price and import prices in the previous year on hourly wage are the same. ($\alpha = 0.05$)

(d). (10 分) Please test the overall significance of the observed regression. ($\alpha = 0.05$)

Table 1. Percentage points of the t distribution

Example Pr(t>2.160)=0.025 when degree of freedom(df)=13

Pr \ df	13	14	15	60	100	120
0.025	2.160	2.145	2.131	2.000	1.984	1.980
0.05	1.771	1.761	1.753	1.671	1.660	1.658

Table 2. Upper percentage points of the F distribution

Example Pr(F>4.67)=0.05 for N_1=1 and N_2=13

df for denominator N_2	df for numerator N_1				
	1	2	3	4	5
13	4.67	3.81	3.41	3.18	3.03
14	4.60	3.74	3.34	3.11	2.96
15	4.54	3.68	3.29	3.06	2.90

Table 3. Durbin-Watson d statistic: Significance points of d_L and d_U at 0.05 level of significance

	k'=1		k'=2	
n	d_L	d_U	d_L	d_U
40	1.442	1.544	1.391	1.600