淡江大學九十一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「○」否則打「×」	
計算機	字典
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請將答案寫在答案紙上，　在試題紙上作答，　不予計分。

1. Let X and Y be two random variables such that $3X = Y + 4$.
a. (5%) Express Cov (X,Y) in terms of $V(X)$.
b. (5%) Express $V(Y)$ in terms of $V(X)$.
c. (5%) Calculate the correlation coefficient (ρ_{XY}).

2. Suppose you were given a random sample of 5 observations, X_1, X_2, X_3, X_4, X_5, which were drawn independently from a normal distribution N(μ, σ^2).

Consider the following two estimators of μ : $\hat{\mu}_1 = (\sum_{i=1}^{4} X_i)/8 + X_5/3$ and $\hat{\mu}_2 = (\sum_{i=1}^{4} X_i)/5 + X_5/5$.

a. (6%) Are the two estimators unbiased?
b. (6%) Find the variances of the estimators.
c. (3%) Which estimator do you prefer?　Why?

3. A manager in the planning department of an auto manufacturer was interested in estimating the demand model for cars in 2001 in Taiwan.　She considered the model $NCAR = \beta_1 + \beta_2 INCOME + u_1$, where $NCAR=$ number of cars per household and $INCOME =$ total income of the household.　Data on $NCAR$ and $INCOME$ for 8 households were randomly sampled in Taiwan as the following.

NCAR	INCOME (Unit: NT$100,000)
3	18
2	10
1	8
1	6
1	3
0	3
1	4
0	6

a. (6%) Estimate the regression of $NCAR$ on $INCOME$.　In other words, you need to

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◀ 注意背面尚有試題 ▶

calculate the intercept and the slope of the regression line.

b. (6%) Calculate the standard errors associated with the intercept and slope of the regression line.

c. (9%) Is the coefficient of *INCOME* significant at the 5 percent level? (Note: $t_{(\alpha=0.05, d.f.=8)}=2.306; t_{(\alpha=0.05, d.f.=7)}=2.365; t_{(\alpha=0.05, d.f.=6)}=2.447)$ Show the null hypothesis and the alternative hypothesis.

d. (6%) Does omitting number of people living in a household result in a downward or upward bias in the *INCOME* coefficient? Explain.

e. (10%) Calculate the value of R^2. What does it mean?

f. (12%) Calculate the value of F statistic and the critical value of F statistic at the five-percent significance level. Please test whether the coefficient of *INCOME* is significant at the five-percent level or not by using the F statistic. Show the null hypothesis and the alternative hypothesis. Is the result consistent with the result of the t test (3.c.). Why?

g. (6%) In the case of a simple linear regression model, does the analysis-of-variance table give any more information than the t statistic?

4. Consider the trivariate model $Y_t = \beta_1 + \beta_2 X_{2t} + \beta_3 X_{3t} + u_t$.

a. (5%) If $X_{2t} + X_{3t} = 6$, can you estimate the model? If yes, how? If not, why not?

b. (5%) If $X_{2t} = 6X_{3t}$, can you estimate the model? If yes, how? If not, why not?

c. (5%) If $X_{2t}X_{3t} = 6$, can you estimate the model? If yes, how? If not, why not?