

准帶項目請打「V」	
✓	簡單型計算機

本試題共 2 頁，5 大題

本試題雙面印製

1. Consider the simple regression model $y_i = \alpha + \beta x_i^* + u_i$.

In practice, we measure x_i^* by x_i such that

(1) $x_i = x_i^* + 5$

(2) $x_i = 3x_i^*$

(3) $x_i = x_i^* + \varepsilon_i$, where ε_i is a purely random term with the usual properties.

What will be the effect of these measurement errors on estimates of true α and β ?

2. Consider the model:

$$y_i = \alpha + \beta x_i + u_i$$

where $u_i = \rho_1 u_{i-1} + \rho_2 u_{i-2} + \varepsilon_i$, that is, the error term follows an AR(2) scheme, and where ε_i is a white noise error term.

- (1) Will u_i still satisfy classical assumptions such that OLS estimators are BLUE.

Please justify your answers.

- (2) Outline the steps you would take to estimate the model taking into account the second-order autocorrelation.

3. Considering the following models:

$$\ln y_i^* = \alpha_1 + \alpha_2 \ln x_i^* + u_i^*$$

$$\ln y_i = \alpha_1 + \alpha_2 \ln x_i + u_i$$

where $y_i^* = w_1 y_i$ and $x_i^* = w_2 x_i$, the w 's being constants.

- (1) Establish the relationships between the two sets of regression coefficients and their standard errors.

- (2) Is R^2 different between the two models? Why?

◀ 注意背面尚有試題 ▶

准帶項目請打「V」

簡單型計算機

本試題共 2 頁，5 大題

4. Suppose y_i is distributed i.i.d. $N(0, \sigma^2)$ for $i=1, 2, \dots, n$.

(1) Show that $E(y_i^2 / \sigma^2) = 1$.

(2) Show that $w = \frac{1}{\sigma^2} \sum_{i=1}^n y_i^2$ is distributed χ_n^2 .

(3) Show that $E(w) = n$.

(4) Show that $v = \frac{y_1}{\sqrt{\frac{\sum_{i=1}^n y_i^2}{n-1}}}$ is distributed t_{n-1} .

5. Let y_1, y_2, \dots, y_n be i.i.d. draws from a distribution with mean μ . A test of $H_0: \mu = 5$ versus $H_1: \mu \neq 5$ using the usual t-statistic yields a p-value of 0.03.

(1) Does the 95% confidence interval contain $\mu = 5$? Explain.

(2) Can you determine if $\mu = 6$ is contained in the 95% confidence interval? Explain.