

科目：統計學 適用：財金所

編號：353

考生注意：

1. 依次序作答，只要標明題號，不必抄題。
2. 答案必須寫在答案卷上，否則不予計分。
3. 限用藍、黑色筆作答；試題須隨卷繳回。

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1. Suppose we have a random sample of 50 P/E ratios (50 Xs) from this normal population, as shown in Table 1. Find the 95% confidence interval for population average P/E ratio. (15%)

Table 1: Hypothetical sample of 50 P/E ratios

P/E ratio	6	7	8	9	10	11	12	13	14	15	16	18
Frequency	2	2	5	6	5	7	5	4	3	4	6	1

Mean=11.5, Sample variance=3.0456, Median=Mode=11

2. This problem is the characteristic line of modern investment analysis. Based on 240 monthly rates of return on the S&P 500 (r_{mt}) for the period 1956-1976. We obtained the following results for the rate of return on IBM stock (\hat{r}_t).

$$\hat{r}_t = 0.7264 + 1.0598r_{mt} \quad R^2 = 0.4710$$

standard error=(0.3001) (0.0728)

- (1) Interpret the estimated intercept (5%), slope (5%) and R^2 (5%).
- (2) A security whose beta coefficient is greater than 1 is called a volatile or aggressive security. Set up the appropriate null and alternative hypothesis and test than 1 using the t test. Note: Use $\alpha=5\%$. (10%)

3. State whether the following statements are true, false, or uncertain: An estimator of a parameter is a random variable, but the parameter is non-random, or fixed. It also means that in classical statistics the parameter is assumed to be some fixed number, although unknown. (10%)

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4. Regression analysis is one of the most commonly used tools in econometric work. However, we have to make some assumptions about the error terms. One of the assumptions is that the error terms in the regression model are independent. Now, please answer the following questions:

- (1) What are the consequences of relaxing this assumption? (10%)
- (2) Researchers always adopt the Durbin-Watson (DW) test to detect this problem of serial correlations in error terms. Please describe the DW test briefly. (5%)
- (3) Although the DW test is the most commonly used test for serial correlations. However, the DW test has several limitations. Please briefly describe these limitations of the DW test. (10%)
- (4) One student announces that the DW test is invalid in the models with lagged dependent variables. Do you agree him? Please provide your reasons and a solution for this problem. (10%)

5. Please create a figure to present the relationship among the following distributions: Hypergeometric distribution, Binomial distribution, Bernoulli distribution, Poisson distribution and Normal distribution. (15%)