

考試科目	經濟學	所別	國研所	考試時間	5月24日上午 星期六 (下)	第一節
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國立政治大學圖書館

一、個體經濟 (以下五大題, 每題各佔10%)

1. A factor of production is called an inferior if the conditional demand for that factor decreases as output increases.
 - (1) Show that if the technology is constant returns to scale, then no factors can be inferior.
 - (2) Show that if marginal cost decreases as the price of some factor increases, then that factor must be inferior.
2. A firm has two plants with cost functions $c_1(q_1) = q_1^2$ and $c_2(q_2) = 2q_2$. What is the cost function for the firm?
3. If a particular offence is detected the criminal will be fined. Suppose that social science research has shown that a 1 percent increase in the fine has a smaller deterrent effect than a 1 percent increase in the probability of detection. Does this imply that criminals are risk lovers or risk haters? Why?
4. Suppose that a consumer is demanding two goods: x_1 and x_2 . When the prices of the goods are $p_1=3$ and $p_2=6$, the quantities demanded for the goods are $x_1=1$ and $x_2=2$. When the prices of the goods are $p_1=4$ and $p_2=2$, the quantities demanded for the goods are $x_1=2$ and $x_2=1$. Is this consumer maximizing utility? Why?
5. A consumer receives income and purchases an aggregate good in each of two periods. The consumer's utility function is $u(x_1, x_2) = x_1x_2 + 5x_2$ where x_1 and x_2 denote consumption in periods 1 and 2, respectively. Incomes in the two periods are $y_1=10$ and $y_2=20$, respectively, and prices in the two periods are $p_1=p_2=1$.
 - (1) Suppose that the consumer may save income not used in period 1 for use in period 2 (at zero interest) but cannot borrow. What is the optimal consumption level in each period?
 - (2) Now suppose that the consumer may borrow and lend at an interest rate 10%. What is the optimal consumption level in each period in this case? Discuss the difference in the utility levels between this case and that in (1).

備 考 試 題 隨 卷 繳 交

命 題 委 員 :

-85-

(簽章) 92年 5月 12日

考試科目	經濟學	所別	國史所	考試時間	5月24日上午第一節 星期六 (下)
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國立政治大學圖書館

- 二.
- Suppose that the government launches a program to help unemployed workers learn new skills, find new jobs and relocate as necessary to take the new jobs. (a) (7%) If this program reduces structural unemployment, what is the effect of the expectation-augmented Phillips curve and the long-run Phillips curve? (b) (7%) The government program is expensive, and critics argue that a cheaper way to cut out unemployment would be by monetary expansion. Comment.
 - (10%) Suppose that the economy begins in a long run equilibrium. The central bank then decides to decrease the money supply. Discuss the short run impact of this actions on wages, inflation, unemployment, and output. Explain in detail the process by which the economy returns to a long run equilibrium. Provide the AD-AS graphs to illustrate the process.
 - Suppose Central Bank A cares only about keeping the price level stable, and Central Bank B cares only about keeping output and unemployment rate at their natural rates. Explain how each Central Bank responds to
 - (6%) An exogenous decrease in the velocity of money.
 - (6%) An exogenous increase in the price of oil.
 - (7%) According to the neo-classical growth model, what should be the correlation between a country's saving/investment rate and its steady state per capita growth rate? Explain.
 - (7%) The Finance Minister is seeking advice regarding whether he should use monetary policy or fiscal policy to combat the recent recession. The table below shows that GDP has been falling over the last 5 quarters. Given the information in this table, how would you advise the Minister?

year	price level	interest rates	GDP
2001:1	100	8	275
2001:2	75	5.5	268
2001:3	69	7	267
2001:4	65	5	255
2002:1	35	3.5	230

備 考 試 題 隨 卷 繳 交

命 題 委 員 :

-86-

(簽章) 92年5月17日

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3. 試題由郵寄遞者請以掛號寄出，以免遺失而示慎重。

考試科目	統計學	所別	國貿所	考試時間	月	日	上午	第	節
					星期		下		

- (1) State the definitions of "convergence in probability" and "convergence almost surely". (8%)
 - (2) What are the differences between the two concepts of convergence as defined in (1). (7%)

2. Consider the following linear regression model

$$y_i = \alpha + \beta'x_i + u_i \quad (\beta_{k \times 1})$$

$$u_i \text{ i.i.d.}(0, \sigma^2)$$

Suppose we want to test

A. $H_0: \beta_i = 0 \quad i = 1, 2, \dots, k$

$H_A: \beta_i \neq 0 \quad i = 1, 2, \dots, k$

B. $H_0: \beta_1 = \beta_2 = \dots = \beta_k = 0$

$H_A: \beta_i \neq 0 \text{ for some } i = 1, 2, \dots, k$

- (1) What test procedures would you perform for testing A and B? (7%)
 - (2) Usually one of the test procedures we perform for testing B is F test. How the F test is related to Wald statistic? (8%)

3. Suppose that X_1, \dots, X_n form a random sample from a uniform distribution on the interval $(0, \theta)$, where the value of parameter θ is unknown ($\theta > 0$). The p.d.f. $f(x|\theta)$ of each observation has the following form:

$$f(x|\theta) = \begin{cases} \frac{1}{\theta} & \text{for } 0 \leq x \leq \theta \\ 0, & \text{Otherwise.} \end{cases}$$

- (1) Derive the M.L.E. (the maximum likelihood estimator) of θ . (5%)
 - (2) Is the M.L.E. of θ obtained in (1) an appropriate estimator of θ ? Why or Why not? (5%)

4. State Neyman-Pearson Lemma. (10%)

考試科目	統計學	所別	國政	考試時間	星期 月 日 上午 下午 第 節
<p>5. Consider the random variable X with probability density function:</p> $f_X(x; \theta) = (\theta - 1)x^{-\theta} \quad \theta > 2, x > 1.$ <p>Consider an <i>ex ante</i> random sample:</p> $\{X_i\}_{i=1}^n.$ <p>(a) Define the maximum likelihood estimator of θ and solve for it explicitly. (10%)</p> <p>(b) Is the maximum likelihood estimator of θ an unbiased estimator? Explain your answer fully. (5%)</p> <p>6. A fisherman has a fifty percent chance of catching a steelhead with salmon roe and a ten percent chance with trout flies. Flies are cheap and durable and are used eighty percent of the time. Suppose a steel head has been caught. What is the probability that roe has been used? (10%)</p> <p>7. Consider three independent random variables:</p> X_1, X_2, X_3 <p>each independent of the other and each having the same mean and variance. Consider two other random variables:</p> $Y_1 = X_1 - X_2$ $Y_2 = X_2 - X_3$ <p>Calculate the correlation coefficient between Y_1 and Y_2. (10%)</p> <p>8. In a survey of homeless people on the streets of the city Imagine, there were four cases of Severe Acute Respiratory Syndrome (SARS) among the 181 people studied. Suppose that the number of SARS incidences expected in the general population is .36 percent (.0036). The incidence of the disease among the homeless group, therefore, was roughly six times higher. "The elevated risk of SARS is striking," the epidemiologists wrote, "and the occurrence of the four SARS is somewhat unusual." Evaluate the epidemiologist's statement using a hypothesis test. Make sure that you state the null and alternative hypotheses in symbols, show all your work, and explain your results. (15%)</p>					
備 考	試題隨卷繳交				
<p>命題委員：</p> <p style="text-align: center;">-88- (簽章) 92年5月9日</p>					

國立政治大學圖書館

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