

考試科目	個體經濟學	所別	經濟學系	考試時間	5月16日 星期六	第 1 節
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1. (20%) There are two firms in a market. They produce perfect substitutes at cost  $C(q) = q^2/2$ . The demand is  $p = 1 - (q_1 + q_2)$ .
- (1) (3%) Compute the Cournot equilibrium.
- (2) (17%) Suppose now that firm 1 has the opportunity to sell the same output on another market as well. The quantity sold on this market is  $x_1$ , so firm 1's cost is  $(q_1 + x_1)^2/2$ . The demand on the second market is  $p = a - x_1$ . Consider the Cournot game in which firm 1 chooses  $q_1$  and  $x_1$  and firm chooses  $q_2$  simultaneously. Show that  $q_1 = (2 - a)/7$  and  $q_2 = (5 + a)/21$  over the relevant range of  $a$ . Show that for  $a = 1/4$  a small increase in  $a$  hurts firm 1. (Use the envelope theorem.) Interpret.

(背面還有試題)

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2. (30%) Consider a simple duopoly problem, with two firms that are identical except in one important sense. The two produce an undifferentiated good, the (total) demand for which is given by the demand curve  $P = A - X$ , where  $P$  is price and  $X$  is total quantity produced. The two compete as Cournot competitors. Both firms have zero marginal costs of production.

One firm is owner managed. The quantity decision for this firm is made by the owner, who retains any profits. This owner is risk neutral.

The second firm is not managed by its owner. The owner of the second firm has hired a manager and has given this manager a contract wherein the compensation paid to the manager is a linear function of the profits the firm earns,  $\pi$ , and the quantity that the firm sells,  $x_2$ . Specifically, this contract calls for the manager to be paid  $\alpha\pi + \beta x_2$ , where  $\alpha$  and  $\beta$  are given constants. The owner retains any profits made by the firm, net of pay to the manager. Note well that the manager makes the quantity decision and not the owner, and the manager does so to maximize *her* compensation and not the net profits of the owner.

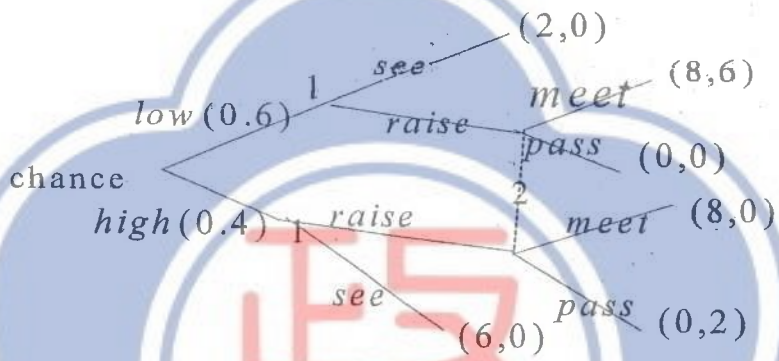
(1) (15%) What, in this case (for given  $\alpha$  and  $\beta$ ), is the Cournot equilibrium in the market? What (as a function of  $\alpha$  and  $\beta$ ) are the profits of the first firm, the manager's compensation, and the net profits (to the owner) of the second firm?

(2) (15%) The owner of the second firm is interested in designing the "optimal" contract for her manager. The contract must, in equilibrium, provide the manager with a reservation level of income  $Y$ . Other than that, the owner can choose any *linear* contract she wishes;  $\alpha$  and  $\beta$  are chosen to maximize her net (after compensation) profits. The owner-manager of the first firm and the manager of the second firm will behave in Cournot fashion after this contract is chosen. If you are worried about such things, the owner-manager of the first firm will know the contract terms under which the manager of the second firm operates. What is that optimal contract? (Hint: Draw pictures!)

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下列所有題目必答

- 3 (1) 請證明在second price sealed bid auction 中, truth bidding 為weakly dominant strategy. (15%)
- (2) 請找出下列賽局之所有的pure Nash equilibrium (10%)



- 4 在Ultimatum game 中, 假設由player I 提出offer 給player II分10元. 若II 接受, 則照所提之offer 來分; 若player II 不接受則兩人均得0元, 假設最小的錢幣單位是1元.
- (1)請找出這賽局所有的subgame perfect equilibrium (10%)
- (2) 此時先採取行動者會有first mover advantage, 請問若假設當player II 不接受時則把10元對半分, 則SPE 為何? 解釋是否仍有first mover advantage? (15%)

考試科目	總體經濟學	所別	經濟系	考試時間	5月16日 星期六	第 2 節
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1. 影響消費的因素有哪些？減稅是否可以刺激消費？為什麼？以及透過哪些途徑影響？亞洲經濟體普遍儲蓄率偏高，主要可能原因為何？政府應如何有效的刺激私人消費？ (15%)
2. 在何種情況下可存在貨幣超中立性(supper neutrality of money)？又貨幣如何可有效刺激實體經濟？請提出至少兩種以上貨幣傳遞過程說明。 (15%)
3. 以人力資本做為內生成長引擎，試分別建構單一部門(one-sector)和兩部門(two-sector)成長模型，並求解其動態調整過程和恆定均衡解(steady state solution)及說明是何種特性支持經濟的長期持續成長。 (20%)

(背面還有試題)

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4. 設一凱因斯模型如下: (25%)

$$Y = C(Y) + I(r) + G$$

$$\frac{M}{P} = L(Y, R)$$

$$r = R - \pi$$

- (1) 解釋為何投資需求為實質利率的函數，而貨幣需求為名目利率的函數。
- (2) 預期物價膨脹率 ( $\pi$ ) 增加，會產生擴張或緊縮效果？利用微積分導引乘數  $dY/d\pi$ ，並以 IS-LM 曲線解釋之。

5. 設一總體經濟模型如下(除  $\alpha$ 、 $\beta$ 、及  $\varepsilon$  外，所有其他變數均以對數表示): (25%)

$$M = P + Y + \varepsilon \quad \text{貨幣需求}$$

$$M = \bar{M} - b(Y - Y_n) \quad \text{貨幣供給 (政策法則)}$$

$$P = P^e + a(Y - Y_n) \quad \text{Lucas 供給函數}$$

上式中，外生變數： $Y_n$  為自然率產出， $\bar{M}$  與  $b$  為貨幣政策參數， $\varepsilon$  為干擾項；內生變數： $M$  為貨幣， $Y$  為產出， $P$  為物價水準， $P^e$  為  $t-1$  期對  $t$  期物價水準的預期。假設理性預期，人們知道模型（包括政策參數）但不知干擾項：

- (1) 解出  $Y$  與  $P$ 。
- (2) 政策參數  $\bar{M}$  與  $b$  如何影響  $Y$  與  $P$ ？解釋為何兩個參數的效果不同。

考試科目	語言經濟學	所別	經濟學研究所	考試時間	五月十六日	第3節
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1. (40 points) Given the specification

$$y_t = \alpha_1 y_{t-1} + \alpha_2 y_{t-2} + e_t,$$

let  $\hat{\alpha}_1$  and  $\hat{\alpha}_2$  denote the ordinary least square estimators of  $\alpha_1$  and  $\alpha_2$ . Suppose that  $y_t$  are generated according to  $y_t = \psi_1 y_{t-1} + u_t$  with  $|\psi_1| < 1$ , where  $u_t$  are independent and identically distributed with mean zero and variance  $\sigma_u^2$ .

- (a) What are the probability limits of  $\hat{\alpha}_1$  and  $\hat{\alpha}_2$ ? Let  $\alpha_1^*$  and  $\alpha_2^*$  denote these limits.
- (b) State the asymptotic normality results of the normalized ordinary least square estimators.
2. (30 points) Consider a linear regression as follows.

$$y_i = x_i' \beta + u_i, \quad i = 1, \dots, n,$$

where  $y_i$  is the dependent variable,  $x_i$  is the explanatory variables, and  $u_i$  is a sequence of identically and independently distributed random variables from the Laplace density

$$f(u) = \frac{1}{2} e^{-|u|}.$$

Please find the likelihood function, derive the first order conditions and the maximum likelihood estimators. Explain briefly what you encounter when you try to obtain the maximum likelihood estimators of this model.

3. (30 points) Take the linear equation  $y = Z\beta + e$ , and consider the following estimators of  $\beta$ .
- (a)  $\hat{\beta}_1$ : the two stage least square estimator using the instruments  $X_1$ .
- (b)  $\hat{\beta}_2$ : the two stage least square estimator using the instruments  $X_2$ .
- (c)  $\tilde{\beta}$ : the generalized method of moment estimator using the instruments  $X = (X_1, X_2)$  and the weight matrix

$$W = \begin{pmatrix} (X_1' X_1)^{-1} \lambda & 0 \\ 0 & (X_2' X_2)^{-1} (1 - \lambda) \end{pmatrix},$$

for  $\lambda \in (0, 1)$ .

Find an expression for  $\tilde{\beta}$  which shows that it is a specific weighted average of  $\hat{\beta}_1$  and  $\hat{\beta}_2$ .