考試科目	Microeconomics	所別	Public Finance	考試時間	May 月 16 日 Saturday 第 1 節

(Q1) (30%) Consider a pure-exchange economy (no production) where there are two consumers $\{A, B\}$ and two goods $\{x_1, x_2\}$. A and B's utility function are as follows:

$$u_A(x_1, x_2) = \theta_A\left(1 - e^{-x_1}\right) + x_2$$

$$u_B(x_1, x_2) = \theta_B x_1 + x_2$$

where $\theta_A > 0$ and $\theta_B > 0$ are two constants. You can consider them as the "taste" parameters. The initial endowments for x_1 and x_2 are ω_1 and ω_2. Person B has the entire stock of x_1; person A and B each own half of the stock of x_2. Let x_2 be the numeraire so that the price of x_2 is one.

(a) Find an competitive equilibrium where person A consumes positive amounts of both goods. (10%) [**Hint**: person B's utility function is linear. The slope of person B's indifference curve has implication on the competitive equilibrium price of x_1. Drawing an Edgeworth box can also be useful.]

(b) Now suppose that person B can act as a monopolist in setting the price of x_1 while person A continue to act as a price-taker. Show that person B will set a price strictly greater than the competitive equilibrium price. (10%) [**Hint**: Figure out what person A's demands are. Use these demands to write down B's maximization problem. Study B's maximization problem.]

(c) Now suppose that person B can set a fixed charge F for the right to purchase x_1 as well as setting the price of x_1. What are person B's optimal F and pricing decision? (10%) [**Hint**: use person A's "participation" constraint to calculate F as a function of price. Recalculate person A's demands as functions of price and F. Use these demands to write down B's maximization problem. Study B's maximization problem.]

〈背面還有試題〉

備考	試題隨卷繳交

考試科目	Microeconomics	所別	Public Finance	考試時間	May 月 16 日 Saturday 第 1 節

(Q2) (25%) There are N sellers and N buyers in a used car market. Denote the quality of a used car as s. If a seller keeps a used car with quality s, he or she receives utility $\theta_0 s$, where $\theta_0 \in [0,1]$ is a constant, same for all sellers. If a buyer purchases a used car with quality s at price p, he or she receives utility $\theta s - p$, where θ is uniformly distributed with support $[0,1]$.

(a) Suppose buyers can observe s (information is perfect). What is the efficient volume of trade? (5%) [**Hint**: figure out the efficient trading condition. Find the fraction of buyers who satisfied this condition. The efficient volume of trade is simply that fraction times N.]

Suppose only sellers know s (hidden information). Although buyers do not know s, they knows s is uniformly distributed with support $[0,1]$.

(b) What's the supply function $S(p)$ for used cars? (5%) [**Hint**: for a given p, figure out the fraction of sellers satisfied this condition. $S(p)$ is simply that fraction times N.]

(c) What's the demand function $D(p)$ for used cars? (5%) [**Hint**: for a given p, figure out the fraction of buyers satisfied this condition. $D(p)$ is simply that fraction times N.]

(d) Calculate the equilibrium. (5%) [**Hint**: to know if you have the correct results or not, check if the equilibrium makes sense only when $\theta_0 \leq 1/2$. Also note that, by intuition, the equilibrium volume of trade should be smaller than the efficient volume of trade.]

(e) Let $\theta_0 = 1/2$ so that there is no trade, and the used car market is "destroyed". Suppose the government steps in and imposes a minimum quality standard $s_0 > 0$. Calculate the new equilibrium. (5%) [**Hint**: if you did everything right, you should be able to see the market is back on business.]

考試科目	Microeconomics	所別	Public Finance	考試時間	May 月 16 日 Saturday 第 1 節

Q3.) (25%) Ayako is an economist currently works in Washington D.C. The job pays her \$150. Ayako has no other income. Her utility function is $u(x, y) = \sqrt{xy}$, where x and y are (the only) two goods that she consumes. Let $(p_x, p_y) = (1, 1)$. Ayako's boss is asking her to move to the company's New York office where $(p_x, p_y) = (1, 4)$. What makes things worse is that the company would not increase Ayako's salary. Ayako was very angry so she went to talk to her boss and argued: "Although I do not mind moving to New York, but this move is *as bad as* a cut in the salary of \$$A$. I *wouldn't mind* moving to New York if I receive a raise of \$$B$."

(a) What is \$$A$? (9%) [**Hint**: figure out EV, the equivalent variation.]

(b) What is \$$B$? (9%) [**Hint**: figure out CV, the compensating variation.]

(c) Can you change the setup of Ayako's utility function in a sensible way so that \$$A$ would equal \$$B$? (7%) [**Hint**: under what conditions will we have EV=CV?]

Q4.) (20%) Before the prince (the one who rides a white horse) arrives, a pack of n (finite) hungry lions surrounds the sleeping Snow-White. The lions are thinking about if they should eat Snow-White. Suppose lions do not share food so that when $m \leq n$ lions decide to eat, each gets to eat with probability $1/m$. The problem is, any lion who eats the sleeping Snow-White will fall into sleep and possibly being eaten by other lions. For lions, the payoff of being eaten is minus infinity. Nonetheless, the payoff of eating Snow-White or another sleeping lion without being eaten is significantly higher—say 100—than the payoff of being hungry—say 0. Finally let's assume lions are very patient (despite that they are all very hungry); the common discount factor of lions is one. All the above are common knowledge among lions. Suppose you were one of the lions and the other lions were as smart as you are. What is your optimal strategy? Would you eat Snow-White? (20%) [**Hint**: look for a pure-strategy subgame perfect Nash equilibrium.]

備考	試題隨卷繳交

國立政治大學 九十八 學年度研究所 (博)碩 士班 入學考試命題紙

考試科目	總體經濟理論	所別	財政學系	考試時間	5 月 16 日 星期 六 第 二 節

1. (30%) Consider a Ramsey-Cass-Koopmans economy that is on its balanced growth path. Suppose that at some time, which we will call time 0, the government switches to a policy of taxing investment income at rate τ. Thus the real interest rate that households face is now given by $r(t)=(1-\tau)f'(k(t))$. Assume that the government returns the revenue it collects from this tax through lump-sum transfers. Finally, assume that this change in tax policy is unanticipated.
   (a) How does the tax affect the $\dot{c}=0$ locus? The $\dot{k}=0$ locus?
   (b) How does the economy respond to the adoption of the tax at time 0? What are the dynamics after time 0?
   (c) How do the values of c and k on the new balanced growth path compare with their values on the old balanced growth path?
   (d) Does your answer to part (c) imply that a policy of subsidizing investment (that is, making $\tau<0$), and raising the revenue for this subsidy through lump-sum taxes, increases welfare? Why or why not?
   (e) How, if at all, do the answers to parts (a) and (b) change if the government does not rebate the revenue from the tax but instead uses it to make government purchases?

2. (20%) Consider the Brock-Mirman problem: to maximize

$$E_0\sum_{t=0}^{\infty}\beta^t \ln c_t$$

Subject to $c_t+k_{t+1}\le Ak_t^{\alpha}\theta_t$, k_0 given, $A>0$, $1>\alpha>0$, where $\{\theta_t\}$ is an i.i.d. sequence with $\ln\theta_t$ distributed according to a normal distribution with mean zero and variance σ^2.

a. (5 pts) Write down the Bellman's equation.

b. (15 pts) Prove that the solution to the Bellman's equation is of the form

$$v(k,\theta)=a\ln k+b\ln\theta+e$$

Give explicit formulas for the constants a, b, e and the policy functions c and k'.

3. (20%) Please answer following questions:
   a. (10 %) Explain the equity premium puzzle.
   b. (10%) Explain the Lucas critique.

(背面還有試題)

備考	試題隨卷繳交

考試科目	總體經濟理論	所別	財政學系	考試時間	5 月 16 日 星期 六 第 二 節

4. (20%) Construct a model with adjustment costs of investment:

(i) The accumulation of capital is subject to adjustment costs. Expenditure on a given increase in capital, $\dot{k} = I$. The investment requires the adjustment cost which is assumed to be $C(I) = I + hI^2/2$, where h is an exogenously given variable.

(ii) The production function is characterized by $Y = F(k)$, where $F_k > 0$ and $F_{kk} < 0$.

(iii)The firm maximizes the discounted value of profits.

Now if the government taxes returns from owning firms at rate τ, show the impacts of this policy on the economy and the dynamics after the policy is imposed *with a diagram*.

5. (10 pts) Suppose that planned expenditure is given by $E = C(Y-T) + I(r) + G$.

(a) How do equal increase in G and T affect the position of the IS curve? Specifically, what is the effect on Y for a given level of r?

(b) Suppose that tax revenues, T, instead of being exogenous, are a function of income: $T = T(Y)$, $T'(Y) > 0$. With this change, find how an increase in $T'(Y)$ affects the slope of the IS curve?

備考	試題隨卷繳交