

國立臺北大學 115 學年度碩士班一般入學考試試題

系(所)組別：財政學系
科 目：經濟學

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☐可 ☒不可使用計算機

Part I

1. Consider a consumer with the utility function $u(x, z) = x^2z$, where x and z are two goods. Let prices be p_x and p_z , and income be m .
 - (a) Derive the uncompensated (Marshallian) demand functions. (7%)
 - (b) Derive the compensated (Hicksian) demand functions. (7%)
 - (c) Explain the differences between the uncompensated demand and the compensated demand. (6%)
2. Consider a perfectly competitive market that consists of 100 identical firms. In the short run, each individual firm has the cost function $TC = 20 + 6q + q^2$, where q is the output level of an individual firm. The market demand is given by $Q^D = 540 - 20P$, where Q^D is the total quantity demanded in the market and P is the market price.
 - (a) What is the shutdown price for an individual firm in the short run? (5%)
 - (b) Derive the short-run market supply function. (5%)
 - (c) Find the equilibrium price and quantity in this market. (5%)
3. Consider a monopolist that serves two separate groups of consumers, labeled Group A and Group B. The inverse demand functions for the two groups are given by $P_A = 50 - q_A$ and $P_B = 30 - q_B$, respectively. The firm's cost function is $TC = \frac{1}{2}Q^2$, where $Q = q_A + q_B$ is the total output.
 - (a) Suppose the firm can distinguish between the two groups of consumers and is able to engage in third-degree price discrimination. Determine the profit-maximizing price and quantity for each group. (10%)
 - (b) Based on your answer in part (a), explain why the monopolist charges a higher price in one group than in the other. (5%)

Part II

1. Consider a Mundell–Fleming model (IS–LM–BP) for a small open economy with perfect capital mobility. The model is described by the following equations:

Goods market:

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

Money market:

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

Foreign exchange market:

$$r = r^*$$

where Y denotes output, C is consumption, I is investment, G is government spending, NX denotes net exports, r is the domestic interest rate, e is the exchange rate (defined as the amount of foreign currency per unit of domestic currency), and r^* is the given world interest rate.

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接背面

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Using this model, analyze the impact of an expansionary fiscal policy (an increase in government spending) on **output** and **its effectiveness** under (a) a floating exchange rate regime and (b) a fixed exchange rate regime.

Illustrate your analysis using IS-LM-BP diagrams and provide a detailed explanation of how the economy adjusts to a new equilibrium. (10%)

2. Consider a closed-economy Solow growth model with a Cobb-Douglas production function:

$$Y = K^{\alpha}L^{1-\alpha}, \quad 0 < \alpha < 1$$

where Y is total output, K is the capital stock, and L is the number of workers available. The population grows at a constant rate $n > 0$.

Capital accumulates according to:

$$\dot{K} = I - \delta K$$

where I denotes total investment and $\delta > 0$ is the constant depreciation rate of capital. National saving S is assumed to be a constant fraction of output and is given by:

$$S = sY$$

where $s \in (0,1)$ is the savings rate, we assume that all savings are fully invested in capital accumulation. Answer the following questions:

- (a) Derive the steady-state level of capital per worker k and the steady-state output per worker y , where $k = K/L$ and $y = Y/L$. (5%)
 - (b) Compute the long-run growth rate of output per worker y and total output Y , and explain why the Solow model is considered an exogenous growth model. (5%)
 - (c) Derive the Golden Rule savings rate in this Solow growth model. (10%)
3. Consider a representative consumer who lives for two periods ($t = 0,1$), and does not leave any bequests. The consumer chooses consumption in each period, C_0 and C_1 , to maximize lifetime utility, taking income in each period M_0 and M_1 , the real interest rate r , and the time preference factor $\beta \in (0,1)$ as given. The utility function is:

$$U(C_0, C_1) = \ln C_0 + \beta \ln(C_1)$$

The consumer can borrow or lend at the real interest rate r and therefore faces the following intertemporal budget constraint:

$$C_0 + \frac{C_1}{1+r} = M_0 + \frac{M_1}{1+r}$$

Please answer the following questions:

- (a) Derive the Euler equation and discuss the economic intuition behind it. (5%)
- (b) Derive the optimal consumption in each period (C_0 and C_1) and the corresponding optimal saving (S_0). (5%)
- (c) **Use a graph to illustrate and explain:** (i) Whether an initial lender could switch to being a borrower when r increases. (ii) Whether an initial borrower could switch to being a lender when r increases. (10%)

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