

國立臺北大學 110 學年度碩士班一般入學考試試題

系（所）組別：經濟學系
科 目：個體經濟學

第1頁 共2頁
☐可 ☒不可 使用計算機

It suffices to state answers without providing details for derivations or computations. Good Luck!
I. Suppose a consumer has a utility function of the form $U(x, y) = \sqrt[3]{27x^2} + 2y$, where y is a composite good. Let $I = 20$ and $P_x = \frac{1}{3}$ be the initial set of income and price of x , respectively. Answer the following questions:

- (a)(5%) What is the compensating variation when P_x increases from $\frac{1}{3}$ to $\frac{1}{2}$?
 - (b)(5%) What is the equivalent variation when P_x increases from $\frac{1}{3}$ to $\frac{1}{2}$?
 - (c)(5%) What is the income effect when P_x increases from $\frac{1}{3}$ to $\frac{1}{2}$?
- II. Given a translog cost function $\ln TC = \beta_0 + \beta_1 \ln Q + \beta_2 \ln w + \beta_3 \ln r + \beta_4 (\ln Q)^2 + \beta_5 (\ln w)^2 + \beta_6 (\ln r)^2 + \beta_7 (\ln w)(\ln r) + \beta_8 (\ln w)(\ln Q) + \beta_9 (\ln r)(\ln Q)$, where Q denotes output, and w and r denote the prices of input L and K , respectively. Answer the following questions:
- (a)(10%) What are the conditions in β 's to ensure that the translog cost function is homogeneous of degree one in w and r ?
 - (b)(5%) What is the condition in β 's for the translog cost function to reduce to the constant elasticity cost function?

III. Given the table of a specific labor market below with some missing information.

Change in equilibrium wage	Change in tertiary-educated population	Change in technology
-0.53	3.19	2.41
-(c)	2.35	-0.25
0.79	2.91	4.08
0.66	2.55	3.52
-0.70	(d)	3.95
1.43	2.53	4.65

- Answer the following questions:
- (a)(5%) Which column represents the demand side, if any?
 - (b)(5%) Which column represents the supply side, if any?
 - (c)(5%) What do you know about the cell labeled (c)?
 - (d)(5%) What do you know about the cell labeled (d)?
- [Hint for (c) and (d): provide a range, for example “the number must be smaller than -1.00,” when you do not know the exact number.]

IV. A hundred identical consumers eat fish (good A) and chips (good B) for lunch. Each consumer eats at most one unit of each good, and the benefit of consumption is \$20 for fish and \$12 for chips. Currently McDaniel is the monopoly firm of both fish and chips, with constant marginal costs \$5 for fish and \$4 for chips. Kenting Fried Fish (KFF for short), whose fish tastes just as good as McDaniel's, is considering to enter into the fish market (but not the chips market). Consider a dynamic game where the KFF first decides whether to enter, and if yes, the two firms engage in Bertrand competition. If not enter, KFF earns zero profit, and McDaniel maintains monopoly. Entry requires a fixed cost $\$f$; after entry, the marginal cost of KFF is \$3, also constant. Let $\$F$ be the maximal value of entry cost that KFF is willing to spend. Suppose that, if the two firms charge the same price for fish, then all consumers will buy from KFF.

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For the next four questions, the consumption values of the two goods are independent. That is, eating fish has a benefit of \$20, whether the consumer eats chips or not; similarly for chips.

- (a)(4%) Suppose that KFF would never enter into the fish market. Find out McDaniel's optimal price for each good and monopoly profit.
- (b)(5%) Suppose that McDaniel sells fish and chips separately (i.e., consumers can purchase only fish or only chips from McDaniel). Find out McDaniel's equilibrium profit after KFF enters into the market, and the value of F .
- (c)(6%) Suppose that McDaniel serves only a set menu, which consists of fish and chips, at a price p^M , and so consumers cannot buy only fish or only chips from McDaniel. Find out McDaniel's equilibrium price p^M and profit after KFF enters into the fish market.
- (d)(4%) Suppose that $f = 2$ and McDaniel only offers the set menu as in question (c). Find out the equilibrium profit of McDaniel and KFF, respectively, of the whole game.

For the remaining three questions in this part, consider fish and chips as perfect complements. That is, a consumer obtains the consumption benefit of \$20 for fish and \$12 for chips only if he eats both fish and chips. For other consumption behaviors (eating only fish, only chips, or nothing), the consumption benefit is zero.

- (e)(4%) Find out McDaniel's monopoly profit (i.e., when KFF would never enter).
- (f)(6%) Suppose that KFF has entered into the market, and McDaniel sells fish and chips separately. Let p_A^K be KFF's price of fish, and p_A^M McDaniel's price of fish and p_B^M McDaniel's price of chips. Find out prices and McDaniel's profit in Bertrand equilibrium.
- (g)(4%) Suppose that $f = 2$ and McDaniel serves only a set menu. Find out McDaniel's profit in equilibrium of the whole game.

V. A father-son pair use the following income streams to finance their living in 2021 and 2022. The father earns \$100 in 2021, but plans to retire early and so will only earn \$20 in 2022. The son is undergoing a training program and earns only \$20 in 2021, but will finish the training and earn \$100 in 2022. By consuming c_1 in 2021 and c_2 in 2022, the father obtains utility $U_F = \min\{c_1, c_2\}$, and the son obtains $U_S = \ln c_1 + 0.8 \ln c_2$. Both c_1 and c_2 are continuous.

- (a)(4%) Suppose that they can save or borrow at zero interest rate, which is close to current situation. How much, if any, would the father and son, respectively, optimally save or borrow in 2021?
- (b)(6%) Suppose that they have no access to the financial market, but can make the following arrangement. The father gives the son an amount of $\$R$ in the red envelope in 2021, and the son gives the father some pocket money $\$P$ in 2022, where R and $P \geq 0$ (a negative amount means the opposite flow of money). Describe all the Pareto optimal pairs (R, P) , if any, that both would agree, and illustrate in a figure. (There is no need to compute the exact number.)
- (c)(7%) Following the previous question, find out all the Pareto optimal pairs, if any, that could be implemented by the financial market (i.e., through private borrowing and saving when both are price-takers), and the corresponding interest rate.