

EE211 Assignment #3 (Section 2 Semester 2/2020)

Instructions:

- Assigned date is Thursday the 13th, May 2021. **Due date is Friday the 21th, May 2021 before 11.59 PM.**
 - Submission is only received through BE Moodle platform as PDF file.
 - Name your file as **StudentID_nickname**, such as 1234567489_Bo.
 - There is no need to rewrite the question into your answer sheets. Indicating clearly question and item number is sufficient.
 - Write your nickname and student ID on top-right corner of the first page.
 - For those who do not have a digital device to write on, you can write your answers in sheets of paper, take pictures, convert them into a single PDF then submit in on Moodle.
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1. Neo loves traveling. Supposed he has two choices of destination, Thailand and Maldives which costs him 3,000 baht and 5,000 baht respectively. His utility received from traveling to Maldives is twice compared to traveling to Thailand. Answer the following questions. (PE)

- If Neo has 10,000 baht of budget, how many times of each destination he will choose to travel and why? Draw his indifference curve and budget line to analyze his decision and indicate details on the graph.
- If his budget increases to 20,000 baht, draw his income-consumption curve. Also plot his income demand of traveling in Thailand, find its slope and explain.

2. Consider a **long-run production** in which there are only two inputs labor and capital, and the input prices for labor and capital are wage (w) and interest rate (r), respectively. Suppose that at the equilibrium levels of labor and capital (L^* , K^*), the marginal product of labor (MP_L) and marginal product of capital (MP_K) are 6 and 8, respectively.

- (5 points) Calculate the marginal rate of technical substitution (MRTS) and state the cost-minimization conditions of this firm, given that the required output is fixed at Q_0 . If the market wage rate (w) is \$3, what is the interest rate at the equilibrium?
- (5 points) Suppose now that the wage rate (w) increases to \$4, ceteris paribus. Draw a diagram to illustrate the changes in the cost-minimizing combination of inputs.

1. Neo loves traveling. Supposed he has two choices of destination, Thailand and Maldives which costs him P_x 3,000 baht and P_y 5,000 baht respectively. His utility received from traveling to Maldives is twice compared to traveling to Thailand. Answer the following questions.

- If Neo has 10,000 baht of budget, how many times of each destination he will choose to travel and why? Draw his indifference curve and budget line to analyze his decision and indicate details on the graph. → MFM's
- If his budget increases to 20,000 baht, draw his income-consumption curve. Also plot his income demand of traveling in Thailand, find its slope and explain.

a) let x be Thailand and y be Maldives

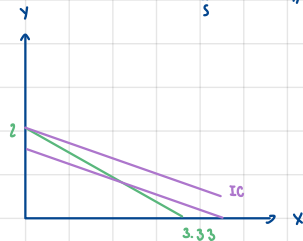
$$BL: 1 = P_x \cdot x + P_y \cdot y$$

$$10,000 = 3000x + 5000y$$

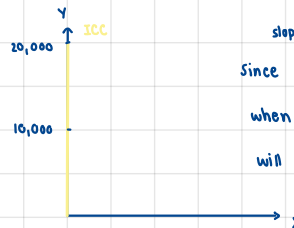
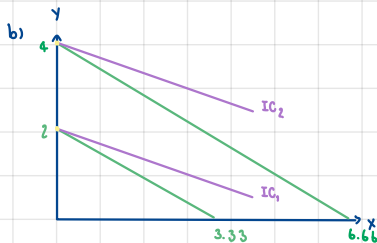
$$\text{slope } BL = \frac{3}{5} = 0.6 \neq$$

$$MRS: MU_y = 2MU_x$$

$$\frac{MU_x}{MU_y} = \frac{1}{2} = 0.5 \neq$$



∴ Neo should choose to travel to Maldives 2 times.



slope = ∞

Since Maldives and Thailand are perfectly substitutable, when consuming income keeps increasing, the ICC curve will be $x = 0$ since Maldives yields higher marginal utility.

2. Consider a **long-run production** in which there are only two inputs labor and capital, and the input prices for labor and capital are wage (w) and interest rate (r), respectively. Suppose that at the equilibrium levels of labor and capital (L^* , K^*), the marginal product of labor (MP_L) and marginal product of capital (MP_K) are 6 and 8, respectively.

- a) (5 points) Calculate the marginal rate of technical substitution (**MRTS**) and state the **cost-minimization conditions** of this firm, given that the required output is fixed at Q_0 . If the market wage rate (w) is \$3, what is the **interest rate at the equilibrium**?
- b) (5 points) Suppose now that the wage rate (w) increases to \$4, ceteris paribus. Draw a diagram to illustrate the changes in the cost-minimizing combination of inputs. → **isocost change**

$$a) \quad MRTS_{LK} = \frac{\Delta K}{\Delta L} = \frac{MP_L}{MP_K}$$

$$MRTS_{LK} = \frac{6}{8}$$

$$\therefore MRTS_{LK} = 0.75$$

cost minimization occurs at

$$\frac{MP_L}{MP_K} = \frac{w}{r}$$

$$0.75 = \frac{3}{r}$$

$$\therefore r = 4 \$$$

∴ The market rate of technical substitution is 0.75

and the interest rate at the equilibrium is 4 \$

b) the wage change causes the isocost to change

$$MRMS_{LK} = \frac{w}{r}$$

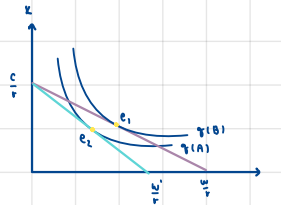
$$MRMS_{LK} = \frac{4}{4}$$

$$\therefore MRMS_{LK} = 1 \neq$$

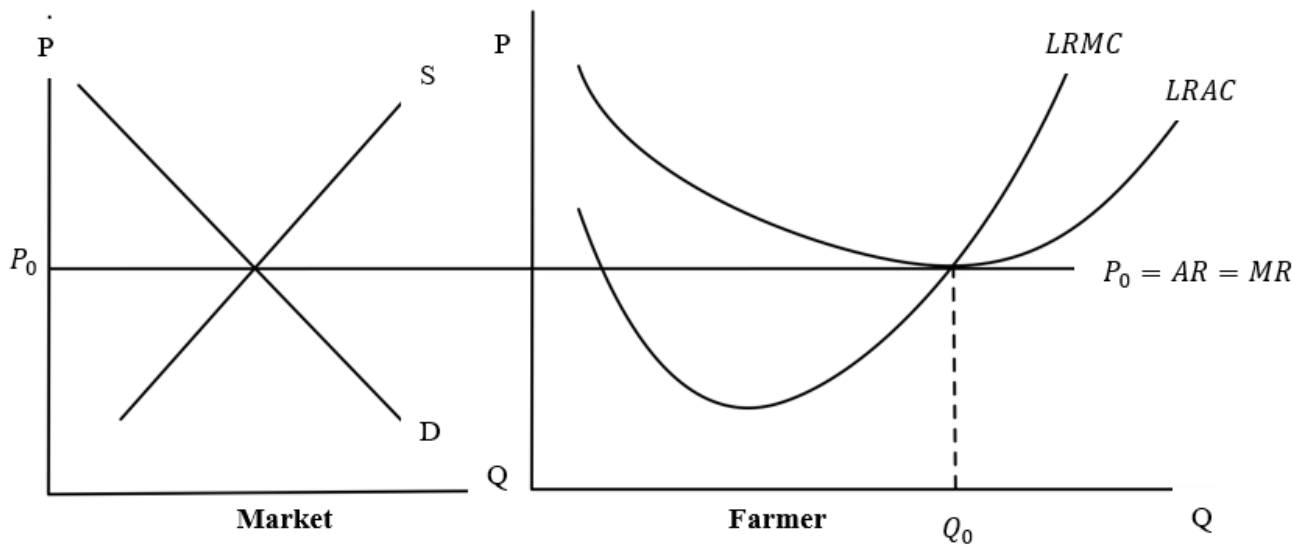
$$\frac{MP_L}{w} = \frac{6}{4} = 1.5$$

$$\frac{MP_K}{r} = \frac{8}{4} = 2$$

∴ The firm will decrease the number of labour from $\frac{w}{r}$ to $\frac{w'}{r}$
and the output will decrease from $q(B)$ to $q(A)$



3. A Thai rice farmer is in a long run equilibrium in a **perfect competition** and produces at the quantity Q_0 as shown in the graph below.



- The government grants a lump sum subsidy to every farmer. How will this change the LRAC? Explain why LRMC does not change.
- Will the lump sum subsidy change the quantity the farmer wants to produce to maximize his profit? Show in the graph that the farmer now earns an Excess Profit. Explain.
- Demonstrate how this Excess Profit will affect the market price in the Long Run that allows new entry to the market.

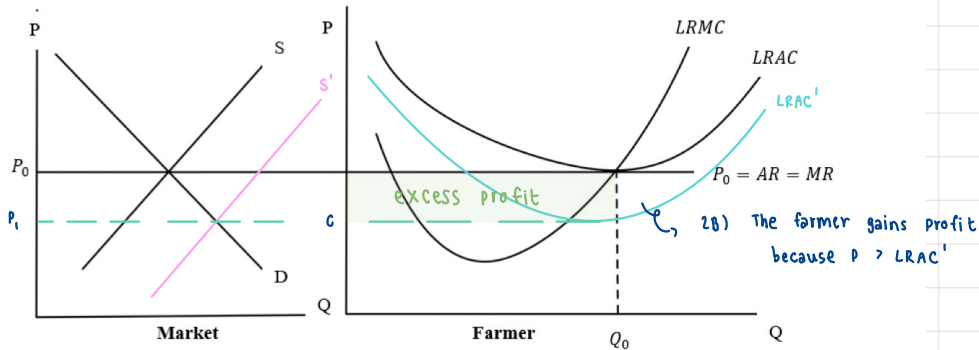
4. An inverse demand function in a monopoly market is given by

$$P = 100 - 5Q$$

Supposed that the **monopolist** is very efficient, which gives a **constant marginal cost of \$20**, answer the following questions. (monopoly)

- How many units of this product will be produced that maximizes monopolist's profit in the short-run? Also, how much does this product cost? Show your argument clearly.
- How much is the total variable cost when the monopolist's profit is maximized?
- If this monopolist has a fixed cost of \$160, how much is the monopolist's profit?

3. A Thai rice farmer is in a long run equilibrium in a perfect competition and produces at the quantity Q_0 as shown in the graph below.



a) The government grants a lump sum subsidy to every farmer. How will this change the LRAC? Explain why LRMC does not change.

: The lump sum subsidy will decrease the LRAC due to the lower fixed cost. But for LRMC, the subsidy is just one time aid from government so it doesn't affect variable factor so LRMC does not change.

b) Will the lump sum subsidy change the quantity the farmer wants to produce to maximize his profit? Show in the graph that the farmer now earns an Excess Profit. Explain.

: No, the quantity that maximize the profit is at $MR = LRMC$ and the lump sum subsidy does not affect either MR or LRMC.

c) Demonstrate how this Excess Profit will affect the market price in the Long Run that allows new entry to the market.

Since there's no barrier to enter the market, new competitors will enter the market due to excess profit which will cause the supply increases. As a result, the market price will decrease to the point that the farmer only gains normal profit and the quantity will increase.

4. An inverse demand function in a monopoly market is given by

$$P = 100 - 5Q \quad \begin{array}{l} AR = -5 \\ MR = 100 - 10Q \end{array}$$

Supposed that the monopolist is very efficient, which gives a constant marginal cost of \$20, answer the following questions.

$$\hookrightarrow MC = AC$$

- a) How many units of this product will be produced that maximizes monopolist's profit in the short-run? Also, how much does this product cost? Show your argument clearly.

$$MC = MR$$

$$P = 100 - 5Q$$

\therefore This product will be produced 16 units in order to maximize monopolist's profit

$$20 = 100 - 10Q$$

$$P = 60 \$$$

in short-run. The marginal cost equals the marginal revenue (price) at 8 units.

$$10Q = 80$$

This product costs \$ 60

$$Q^* = 8$$

- b) How much is the total variable cost when the monopolist's profit is maximized?

$$MC \text{ is constant ; } MC = AC$$

\therefore When the monopolist's profit is maximized,

$$TVC = AC \cdot Q$$

Total variable cost equals 160 \$

$$TVC = 20 \cdot 8$$

$$TVC = 160 \$$$

- c) If this monopolist has a fixed cost of \$160, how much is the monopolist's profit?

$$TR = P \cdot Q$$

$$TC = TFC + TVC$$

$$\Pi = TR - TC$$

$$TR = 60 \cdot 8$$

$$TC = 160 + 160$$

$$\Pi = 480 - 320$$

$$TR = 320 \$$$

$$TC = 320 \$$$

$$\Pi = 160 \$$$

\therefore The monopolist's profit is 160 \$

5. Assumed both a product market and a labor market are perfectly competitive, a table of marginal product is given below. (factors of mkt)

Unit of labor	Marginal product of labor
2	12
3	8
4	6
5	4
6	2

This product can be sold in the market for \$12 each while labor wage is \$48, answer the following questions clearly.

- Figure out how many units of labor this firm will choose as input for its production to maximize profit. Illustrate a graph to support your answer and explain.
- Supposed that there is a sudden economic recession driving consumers' purchasing power downward, what would happen to the units of labor hired by this firm? Support your answer with illustrations that also show a connection between product market and labor market.

6. Consider these statements and indicate which one of the choices fits with each statement and roughly explain why. (mkt failure)

Choices:

- Not a market failure (a) : The price is rely on price mechanism of market .
- Market power (e) : when starbuck can set their coffee price higher than other competitor meaning that starbuck has some market power.
- Externalities (b) : negative externalities from a third party (next room) .
- Public goods (d) : The earthquake alarming is non - excludable and non - rivalrous .
- Moral hazard (c) : It affects the behaviour of Trinity and the company bears the cost of the risk .
- Adverse selection

- People feel that price level is hiking.
- Morpheus always hears a loud fight coming from a room next to his.
- Trinity does not receive her full-benefit until her first 3-month of her work position.
- In Chiang Mai, there is no earthquake alarming system.
- Starbucks coffee is more expensive than Amazon coffee.

5. Assumed both a product market and a labor market are perfectly competitive, a table of marginal product is given below.

Unit of labor	Marginal product of labor
2	12
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4	6
5	4
6	2

This product can be sold in the market for \$12 each while labor wage is \$48, answer the following questions clearly.

$$P = MR$$

- a) Figure out how many units of labor this firm will choose as input for its production to maximize profit. Illustrate a graph to support your answer and explain.

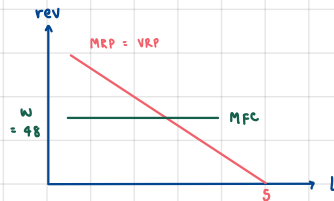
profit is maximized when $MRP = MFC$

$$MR \cdot MP = W$$

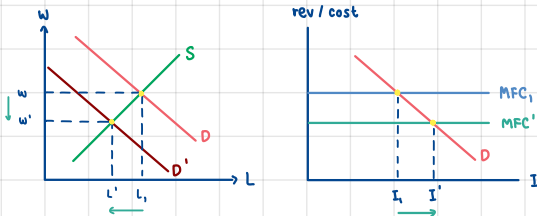
$$12 \cdot MP = 48$$

$$MP = 4$$

∴ Firm should choose 5 units of labour in order to maximize profit



- b) Supposed that there is a sudden economic recession driving consumers' purchasing power downward, what would happen to the units of labor hired by this firm? Support your answer with illustrations that also show a connection between product market and labor market.



∴ The economic recession makes every firm demand less labour from I_1 to I' , Also affects total demand in the market to decrease from D_1 to D' . Declining demand for labour causes wage decrease from w_1 to w' , leading to a decrease in MFC from MFC_1 to MFC' .