

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

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### Instructions:

- Assigned date is Thursday the 13<sup>th</sup>, May 2021. **Due date is Friday the 21<sup>th</sup>, 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.

- a) 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.
- b) 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.

- 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.

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$$a) \text{ budget : } I = P_x x + P_y y$$

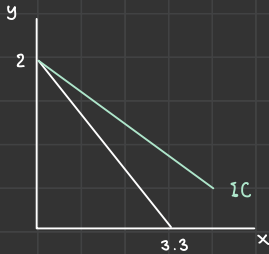
$$10000 = 3000x + 5000y$$

$$\text{Slope BL : } \frac{P_x}{P_y} = \frac{3000}{5000} = 0.6$$

$$\text{Utility : } 2MU_x = MU_y$$

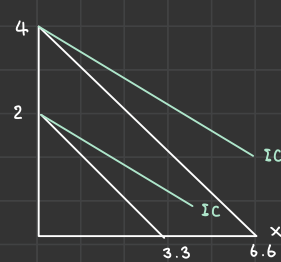
$$\text{Slope of IC : } \frac{MU_x}{MU_y} = 0.5$$

∴ He will choose to travel Maldives 2 times and not travel to Thailand since the utility he received from traveling Maldives is twice compared to Thailand.



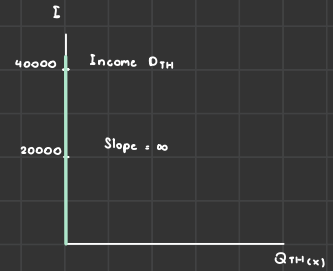
b) when income increase to 40000

Slope BL : 0.6 , Slope of IC : 0.5



$$\text{If } I = 20000 \quad Q_x = 0$$

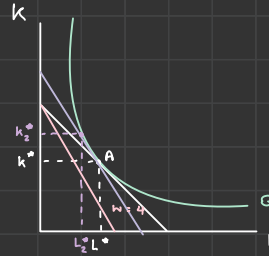
$$\text{If } I = 40000 \quad Q_x = 0$$



∴ Because  $x, y$  are perfect substitution so we still choose to traveling Maldives instead of Thailand.

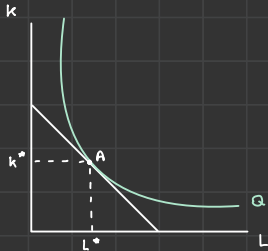
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b)  $w_1 = 3 \rightarrow w_2 = 4$

- Isocost shift inward to the red line
- Since the red line cannot produce the same  $Q_0$  firm have to increase its cost to the purple line.
- At new equilibrium: when wage  $\uparrow$  firm hire  $L \uparrow, K \uparrow$



a) (MRTS)

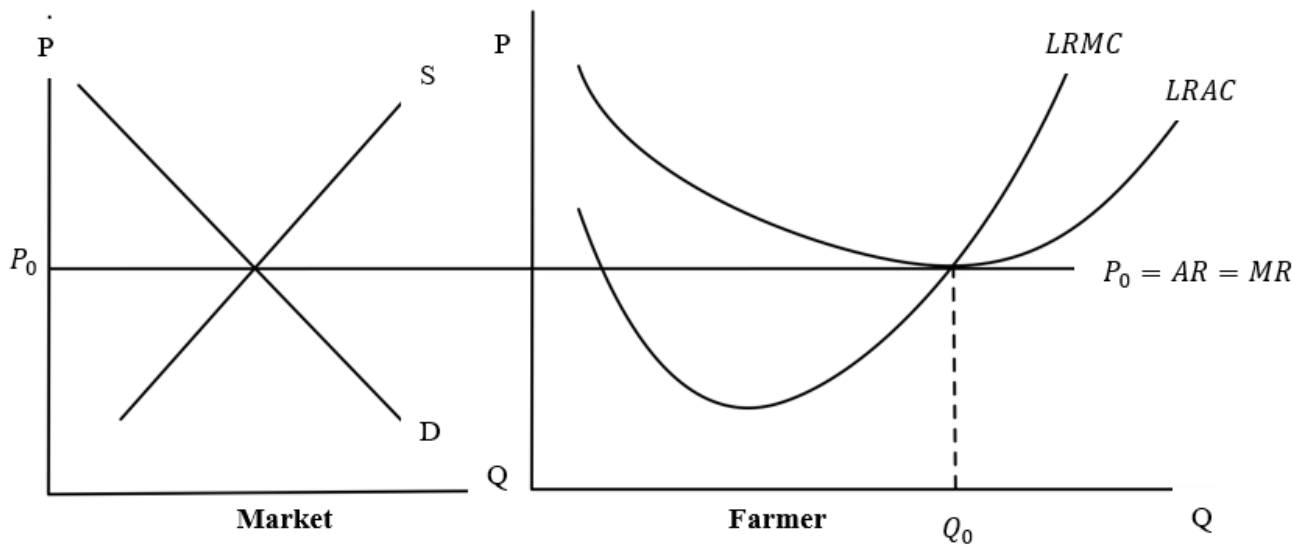
$$\text{slope } ISO_A = \text{slope } ISO_C$$

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

$$\text{cost min} = \frac{MP_L}{MP_K} = \frac{w}{r} \quad \therefore \text{MRTS} = \frac{-MP_L}{MP_K} = -\frac{6}{8} = -0.75$$

$$\frac{6}{8} = \frac{3}{r} \quad \therefore r = 4$$

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.

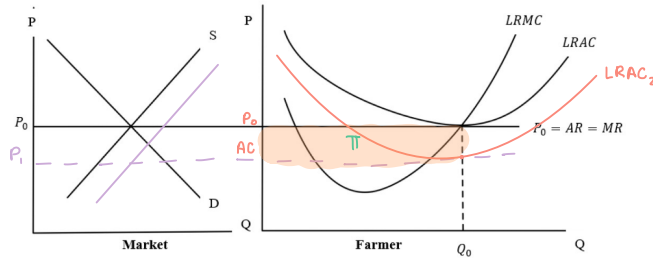
4. An inverse demand function in a monopoly market is given by

$$P = 100 - 5Q$$

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

- 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?

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b) Lump sum subsidy does not change the quantity of farmer because firm maximize profit at  $MR = MC$ , but  $MC$  remain the same profit maximize level of quantity will not change at  $Q_0$

$$\begin{array}{l|l} \text{At } Q_0 : TR = P_0 \times Q_0 & \therefore \pi = TR - TC \\ TC = AC \times Q_0 & \pi = (P_0 - AC) Q_0 \end{array}$$

$\therefore$  In initial LR, firm collects normal  $\pi (\pi = 0)$ , but since Gov. give lumpsum subsidy, firm cost will decrease  $\rightarrow \pi > 0$  is an excess profit.

c) Since old firm have excess profit, the new firm will enter the market, supply will increase (shift rightward). Then, the market price will decrease to  $P_1$ , individual will  $\downarrow P$  as a Price takers

$\therefore \pi$  will decrease when  $\pi_{\text{new}} = 0$  again (normal profit)

Lump sum Subsidy : it will affect FC

$$TC_1 = FC + VC$$

$$TC_2 = (FC - S) + VC$$

$$TC_2 = FC_2 + VC$$

$ATC_2 = AFC_2 + AVC$   $\therefore$  Since  $vc$  remain the same, so slope of  $vc = mc$  remain the same

□ LRAC shift downward

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$$a) \text{ Max } \pi \cdot MC = MR$$

$$20 = 100 - 10a$$

$$10a = 80$$

$$\text{produce: } Q_M^* = 8 \text{ units}$$

$$P_M^* = 60 \text{ €}$$

$$\text{production cost: } TC = VC + FC$$

$$TC = \text{area under } MC + FC$$

$$160 = 8 \times 20 + 0$$

$$160 = 160$$

$$b) \text{ Variable cost} = 8 \times 20 = 160$$

$$c) \pi = TR - TC$$

$$\pi = P \times Q - (FC + VC)$$

$$\pi = (60 \times 8) - (160 + 160)$$

$$\pi = 480 - 320$$

$$\pi = 160$$

$$\text{Find MR } 1. TR = P \times Q$$

$$TR = (100 - 5Q)Q$$

$$TR = 100Q - 5Q^2$$

$$2. \frac{dTR}{dQ} = 100 - 10Q = MR$$

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
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.

- 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.
- 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.

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

**Choices:**

1. Not a market failure
  2. Market power
  3. Externalities
  4. Public goods
  5. Moral hazard
  6. Adverse selection
- a) People feel that price level is hiking.
  - b) Morpheus always hears a loud fight coming from a room next to his.
  - c) Trinity does not receive her full-benefit until her first 3-month of her work position.
  - d) In Chiang Mai, there is no earthquake alarming system.
  - e) Starbucks coffee is more expensive than Amazon coffee.

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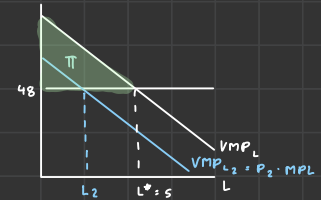
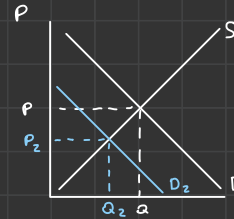
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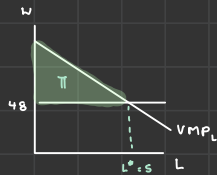
b) If the demand for good is decrease



$\therefore P \downarrow \rightarrow (P \times MP_L) \downarrow \rightarrow VMP_L \downarrow$  shift leftward  $\rightarrow$  firm will hire less labor  
 $\therefore$  if we can sell less product, firm will also hire less labor

a) Firm will choose to hire 5 unit of labor for its production to maximize profit.

$\therefore$  value of Marginal Product  $>$  wage until we hire 5<sup>th</sup> labor,  $VMP_L = W$



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a) Not a market failure: can because the increase in demand, which lead to the increase of price in equilibrium

b) Externalities: It is a negative externality since a loud fight that he hears is a factor causes by other.

c) Moral Hazard: This statement is to solve the change of behavior after receive the deal. Moral Hazard occurs where the actions of the risk-tasking party change after a financial transaction has take place.

d) Public goods: Public good is under-provided in a free market because its characteristic of non-rivalry and non-excludable.

The alarm system is relevant to these characteristics because once it provided it can't stop anyone benefiting from the good and if somebody benefits from good, it doesn't reduce the amount available for other.

e) Market power: Since Starbucks coffee is the brand that have more branch & the demand is more inelastic. market power than Amazon coffee.