

## **Instructions**

- (1) Please read the instruction carefully. Also take this habit with you into the exam room.
- (2) Please read each question carefully and answer the questions straightforwardly. Always provide economic reasons at least a paragraph for your analysis, or a graph when necessary, even when the question does not indicate so.
- (3) Handing and submitting assignments are only available via BE Moodle.

## **Answering the questions and preparing answer sheets**

- (1) Answers are to be handwritten, in either digital or analog form, in a blank canvas or any clean paper. Make sure that your handwriting is clearly visible and readable.
- (2) There is no need to rewrite the question. Just indicate the question number clearly for each of the answer, such as 1.a).
- (3) When done, for the digital case, collage all the pages into a single PDF file. For those who write on sheets of paper, take photo of all pages then convert all of them into a single PDF file as well.
- (4) **Name your PDF file as StudentID\_YourNickname, such as 640123456\_Bo.**

## **Submitting your answers**

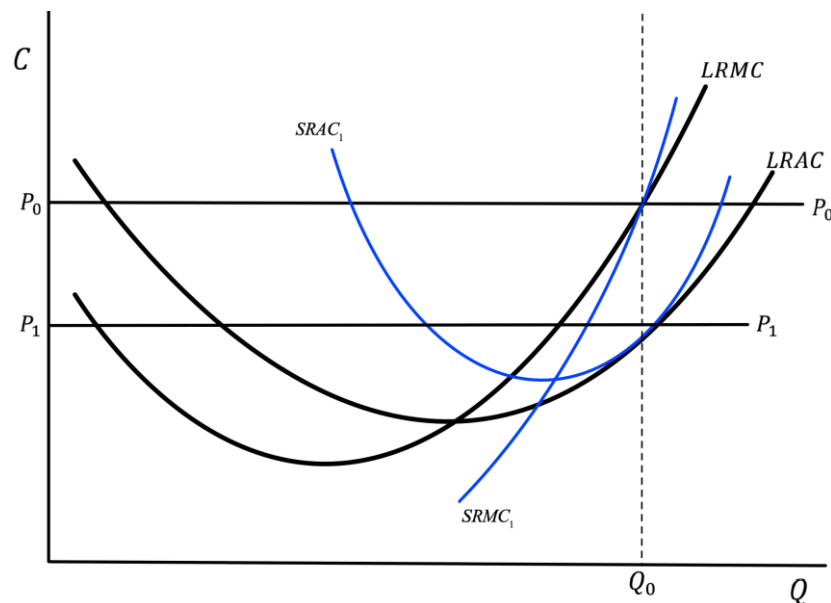
- (1) Make sure your file does not exceed 10MB. This is the maximum file size for BE Moodle upload.
- (2) Login to BE Moodle, head into the course, then the assignment topic.
- (3) Choose your file to submit. Done. There will be timestamp for your upload date and time, so please make sure to not submit later than that.

1. Two COVID-19 vaccines are available in Thailand, Sinovac and Pfizer priced at \$20 and \$40 respectively. Assumed that both vaccines are substitutes, answer the following questions clearly.

1.a) Draw a budget line for these two when a consumer has \$40 and indicate all the essential information on the graph, given that Sinovac is displayed on the horizontal axis while Pfizer is on the vertical axis.

1.b) If a consumer sees that Sinovac is an inferior good while Pfizer is a normal good and Sinovac price is slashed by a half, analyze how consumer's equilibrium changes disaggregating price effect into substitution effect and income effect and explain.

2. In a perfectly competitive market, suppose that every firm is in a long-run equilibrium where each firm receives an excess profit at a market equilibrium price  $P_0$  and produces  $Q_0$  as shown in the graph below.

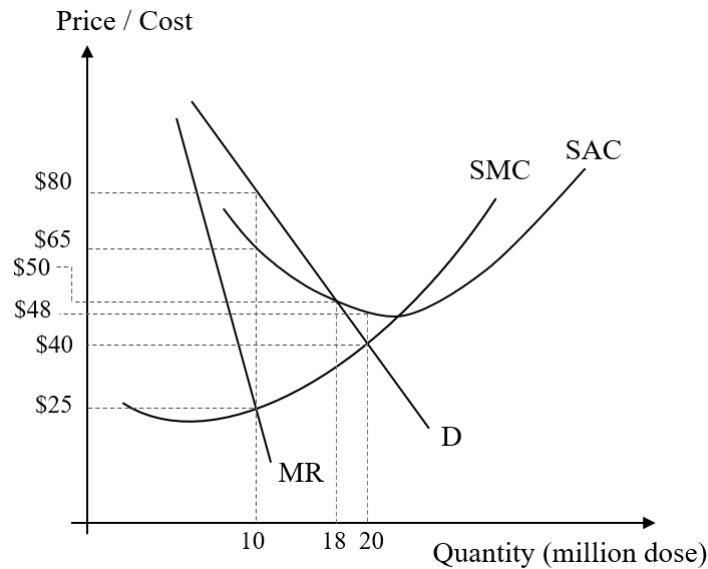


2.a) If the market equilibrium price decreases to  $P_1$ , in the short run according to the given Short-Run cost curves  $SRAC_1$  and  $SRMC_1$ , find the new Short-Run equilibrium quantity  $Q_1$  and profit of the firm. State the equilibrium conditions.

2.b) Show that at the new Short-Run equilibrium quantity  $Q_1$ , the profit earned according to the Long-Run cost curves  $LRAC$  at  $Q_1$  and price  $P_1$  is higher than the profit in Short-Run found in 2.a).

2.c) According to the Long-Run cost curves  $LRAC$  and  $LRMC$ , find the equilibrium quantity the firm wants to produce at the new lower price  $P_1$ , when there is no new seller entering the market. State the equilibrium conditions.

3. Thai government decides to import vaccines from J&J through the Government Pharmaceutical Organization (GPO). Supposed that GPO can act as a private monopoly firm, demand, revenue and cost of importing are displayed in the following graph in USD. Note that a single dose of J&J vaccine is sufficient to immunize COVID-19. Answer the following questions clearly.



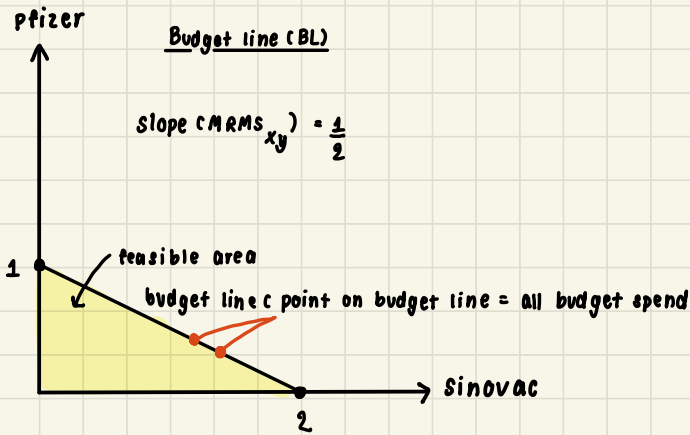
- 3.a) If GPO wants to maximize profit, how many million doses should they import and at which price can be sold for each dose?
- 3.b) According to 3.a), how much is the total profit that GPO receives in million USD?
- 3.c) If the government decides to intervene and set a fair price, how many million doses GPO needs to import and how much the price to be set?
- 3.d) To achieve herd immunity with a new strategy, the target number of people privately vaccinated is 20 million people. How much **for a dose** that each person pays for the vaccine and how much does the government should subsidize **in total**?

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1. Two COVID-19 vaccines are available in Thailand, Sinovac and Pfizer priced at \$20 and \$40 respectively. Assumed that both vaccines are substitutes, answer the following questions clearly.

budget limitations

1.a) Draw a budget line for these two when a consumer has \$40 and indicate all the essential information on the graph, given that Sinovac is displayed on the horizontal axis while Pfizer is on the vertical axis.



(budget)  $\geq$  (total expenditure)

$$40 \geq 20x + 40y$$

find x intercept

$$40 = 20x$$

$$x = 2$$

find y intercept

$$40 = 40y$$

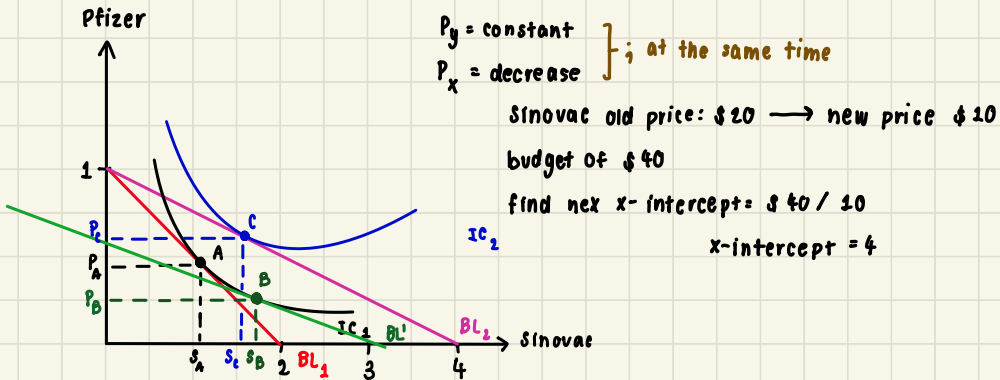
$$y = 1$$

$$MRMS_{xy} = \frac{\Delta y}{\Delta x} = \frac{P_x}{P_y}$$

(sol)  $P_x = \$20$        $\frac{P_x}{P_y} = \frac{20}{40} = \frac{1}{2}$   
 $P_y = \$40$

$\therefore MRMS_{xy} = \frac{1}{2}$  meaning that  $P_x$  is half time cheaper than  $P_y$

1.b) If a consumer sees that Sinovac is an inferior good while Pfizer is a normal good and Sinovac price is slashed by a half, analyze how consumer's equilibrium changes disaggregating price effect into substitution effect and income effect and explain.

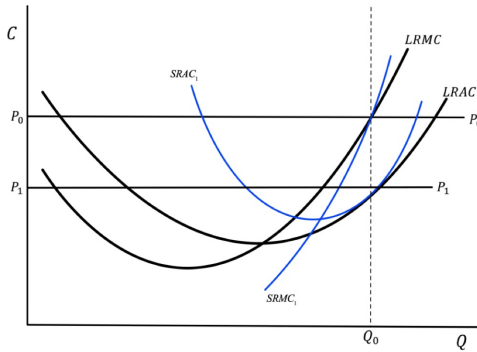


$\therefore$  amount of y stay the same, since x and y are substitutable product when  $P_x$  decrease the  $x^*$  (consumption bundles of x) increase so does the x-intercept. Because consumer's budget stay the same in this case. If consumer's 'real income' increase consumer will then consume less of x since x is an inferior goods.

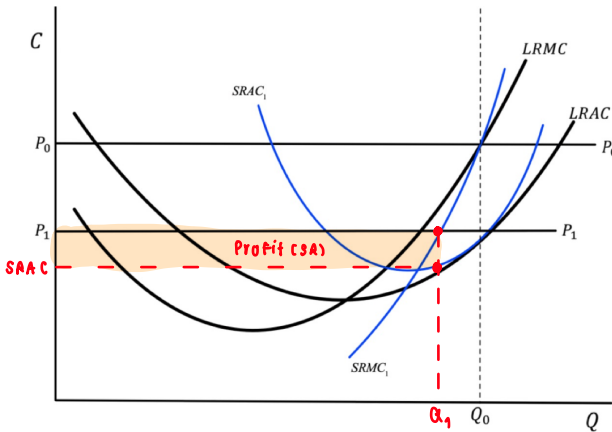
noted that:

inferior goods is a goods that consumer's demand drop as consumer income rise, since when consumer's income increase, consumer can afford higher cost substitutes product

2. In a perfectly competitive market, suppose that every firm is in a long-run equilibrium where each firm receives an excess profit at a market equilibrium price  $P_0$  and produces  $Q_0$  as shown in the graph below.

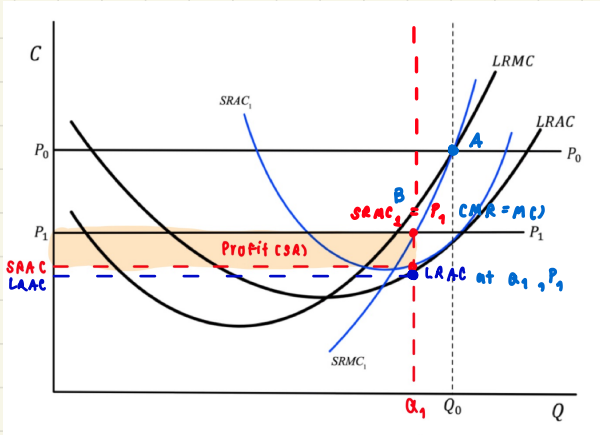


2.a) If the market equilibrium price decreases to  $P_1$ , in the short run according to the given Short-Run cost curves  $SRAC_1$  and  $SRMC_1$ , find the new Short-Run equilibrium quantity  $Q_1$  and profit of the firm. State the equilibrium conditions.



•  $\text{Max } \pi : MR = MC$   
 $P_1 = SRMC_1$   
 $\therefore \pi_{S_4} = (P_1 - SAAC_1) \cdot \alpha_1^*$

2.b) Show that at the new Short-Run equilibrium quantity  $Q_1$ , the profit earned according to the Long-Run cost curves  $LRAC$  at  $Q_1$  and price  $P_1$  is higher than the profit in Short-Run found in 2.a).



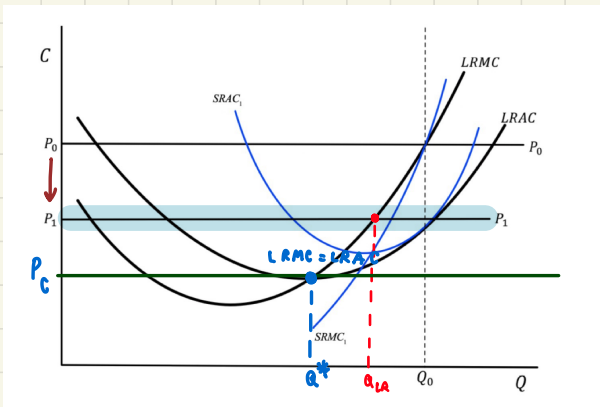
$$\pi_{SR} = (P_1 - SRAC) \times Q_1$$

$$\pi_{LR} = (P_1 - LRAC) \times Q_1$$

• due to  $LRAC < SRAC$   
 $\therefore \pi_{LR} > \pi_{SR} \neq$

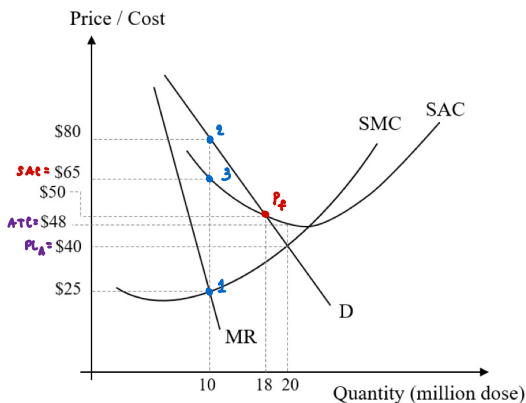
2.c)

2.c) According to the Long-Run cost curves  $LRAC$  and  $LRMC$ , find the equilibrium quantity the firm wants to produce at the new lower price  $P_1$ , when there is no new seller entering the market. State the equilibrium conditions.



$\therefore$  the equilibrium quantity at the new lower price  $P_1$  at the  $P_C = LRMC = LRAC$

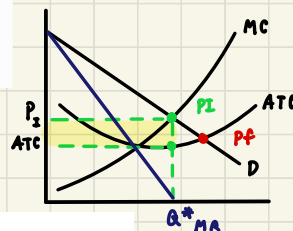
3. Thai government decides to import vaccines from J&J through the Government Pharmaceutical Organization (GPO). Supposed that GPO can act as a private monopoly firm, demand, revenue and cost of importing are displayed in the following graph in USD. Note that a single dose of J&J vaccine is sufficient to immunize COVID-19. Answer the following questions clearly.



3.a) If GPO wants to maximize profit, how many million doses should they import and at which price can be sold for each dose?

$$Q_m^* = 10 \text{ million doses}$$

$$P_m^* = 80 \$ \text{ per dose}$$



3.b) According to 3.a), how much is the total profit that GPO receives in million USD?

$$\pi = (80 - 65) \cdot 10 = 150 \$ \text{ million}$$

3.c) If the government decides to intervene and set a fair price, how many million doses GPO needs to import and how much the price to be set?

$$Q_m^* = 18 \text{ million doses}$$

$$P_f^* = 50 \$ \text{ per dose}$$

3.d) To achieve herd immunity with a new strategy, the target number of people privately vaccinated is 20 million people. How much for a dose that each person pays for the vaccine and how much does the government should subsidize in total?

When government need  $Q^* = 20$  million doses, the monopoly faces loss due to  $ATC > P_3^*$

$\therefore$  government must subsidize total loss - in order to create incentive for monopoly

$$\therefore \text{subsidize} \rightarrow (ATC - P) \times Q^* \rightarrow (48 - 40) \cdot 20 = 160 \$ \text{ million}$$