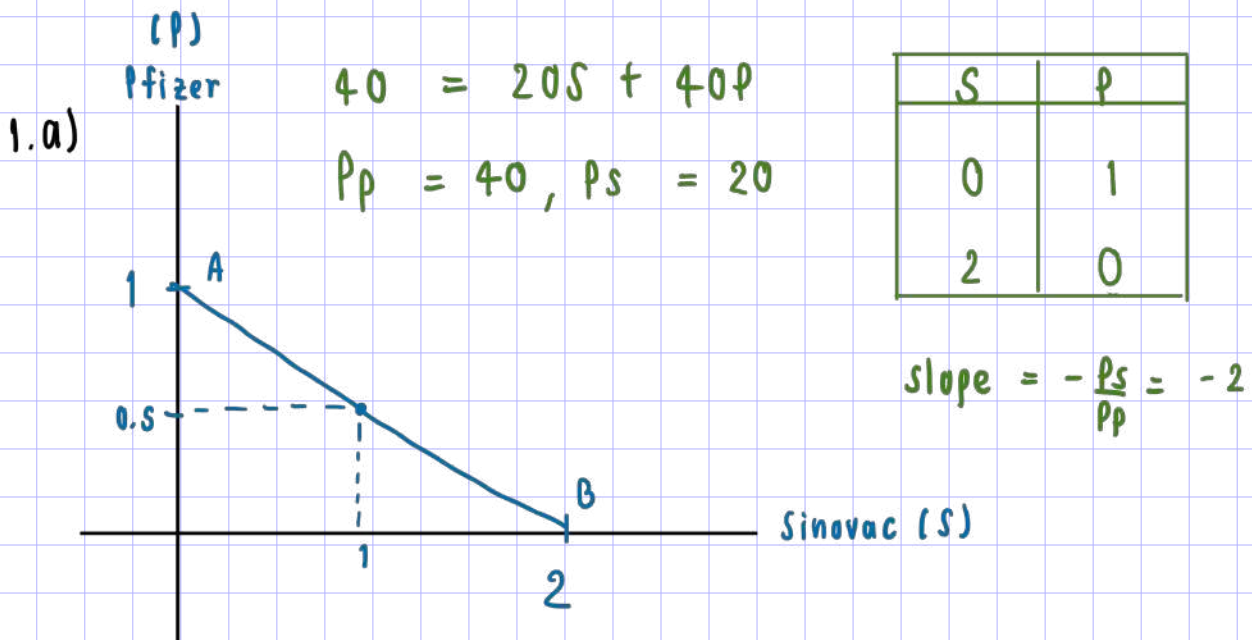


EE211 Assignment 3

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.

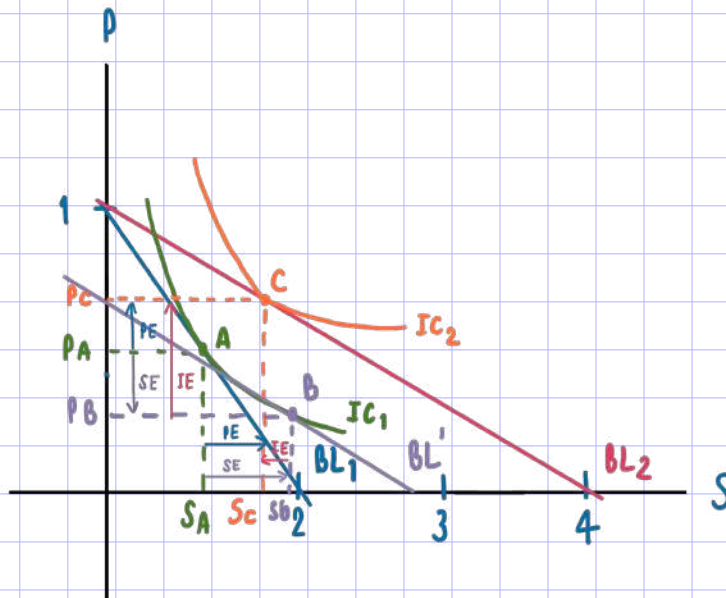


- Figure above shows the graph of a budget line AB. The consumer has an income (I) = \$40, the price of Pfizer (P_p) = \$40 per unit, and the price of Sinovac (P_s) is \$20 per unit. If a consumer spent all \$40 on Pfizer, he will be able to purchase, at most, $I/P_p = 40/40 = 1$ unit of Pfizer. This defines point A. So the vertical intercept of the budget line is at $P = 1$. Likewise, if a consumer buys only Sinovac, he will be able to buy at most $I/P_s = 40/20 = 2$ units of Sinovac. This defines point B. So the horizontal intercept of the budget line is at $S = 2$.

- Assume that Pfizer and Sinovac are not perfect substitutes, IC will be in convex shape.

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.

1. b)



- Sinovac is an inferior good which price slashed by half from 20 → 10

Substitution effect : When price of Sinovac falls down, consumer tend to switch more to

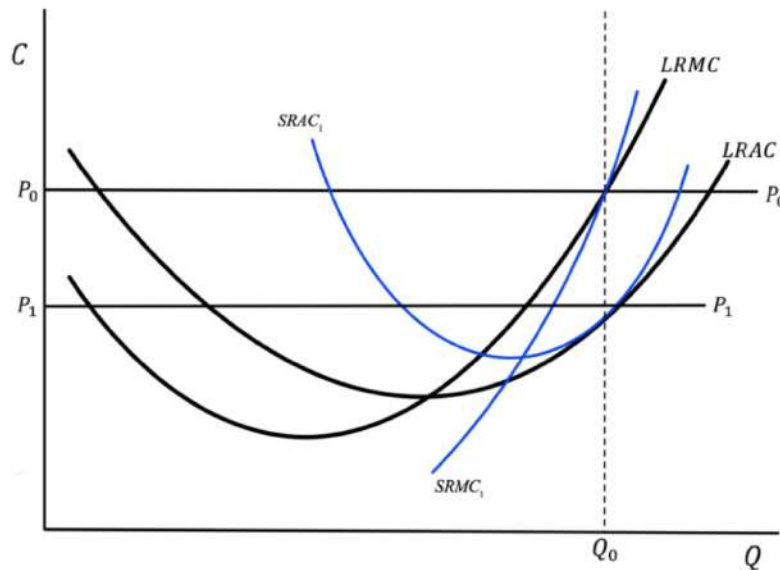
Sinovac as it become cheaper and buy less Pfizer as it is relatively more expensive to maintain a constant level of utility.

Income effect : When Sinovac price decreases, BL' will move to BL2 and it leads to

an increase of consuming Sinovac as inferior good.

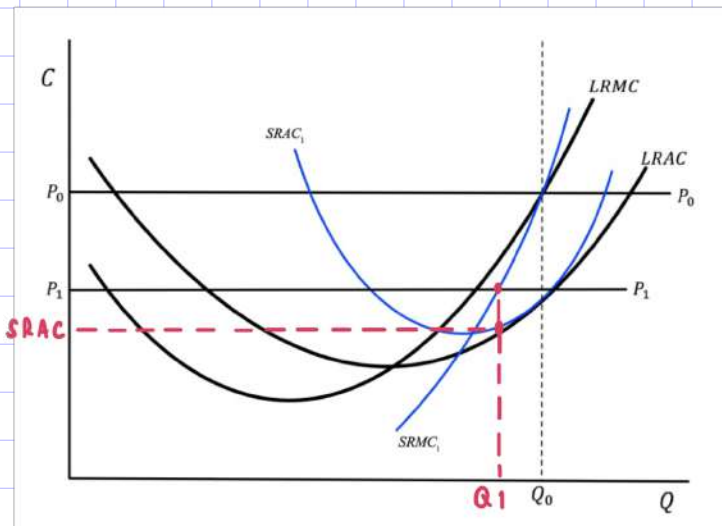
Price effect : When Sinovac price decline, consumer will consume more Sinovac as ordinary good.

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.a)



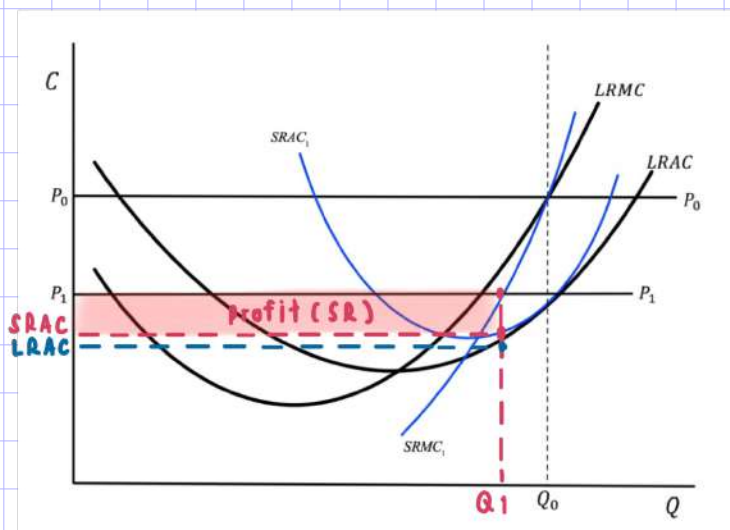
$$\text{Max } \Pi : MR = MC$$

$$P_1 = SRMC_1$$

$$\Pi_{SR} = (P_1 - SRAC_1) \cdot Q_1^*$$

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).

2.b)



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

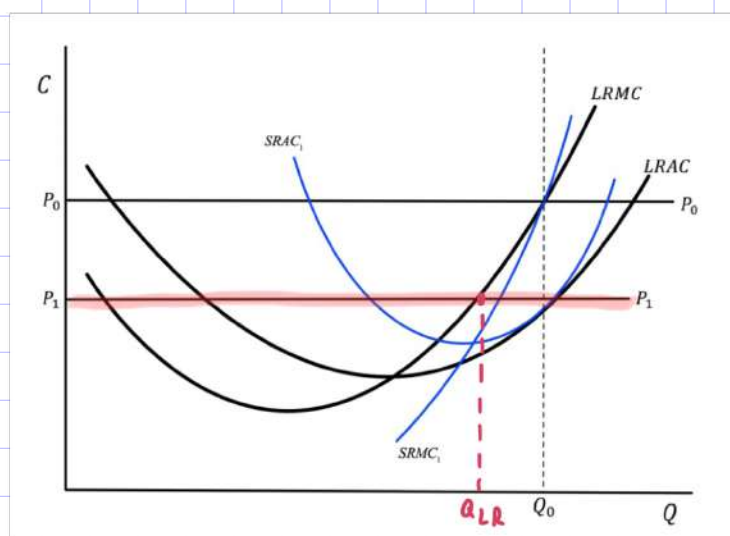
$$\pi_{LR} = (P_1 - LRAC) \cdot Q_1$$

$$LRAC < SRAC$$

$$= \pi_{LR} > \pi_{SR}$$

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.

2.c)

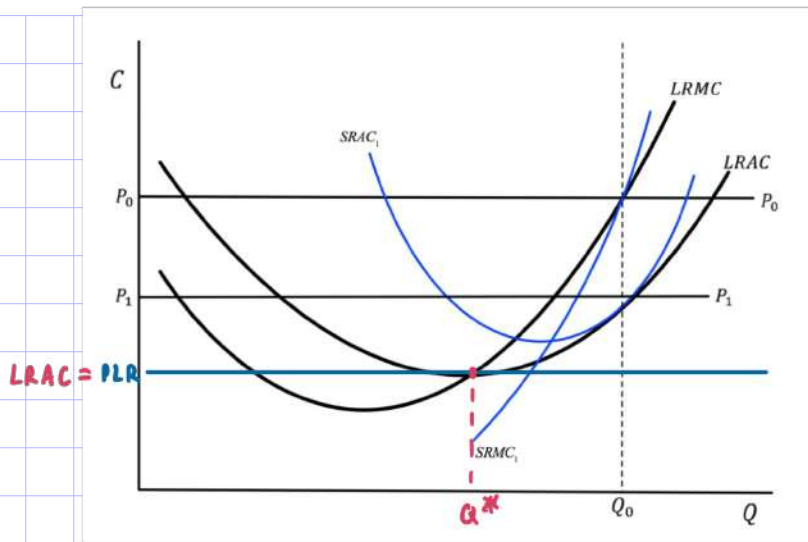


New lower price P_1

Q_{LR} is Q^* at long run P_1

LR equilibrium at P_1

$$P_1 = LRMC$$



No new sellers

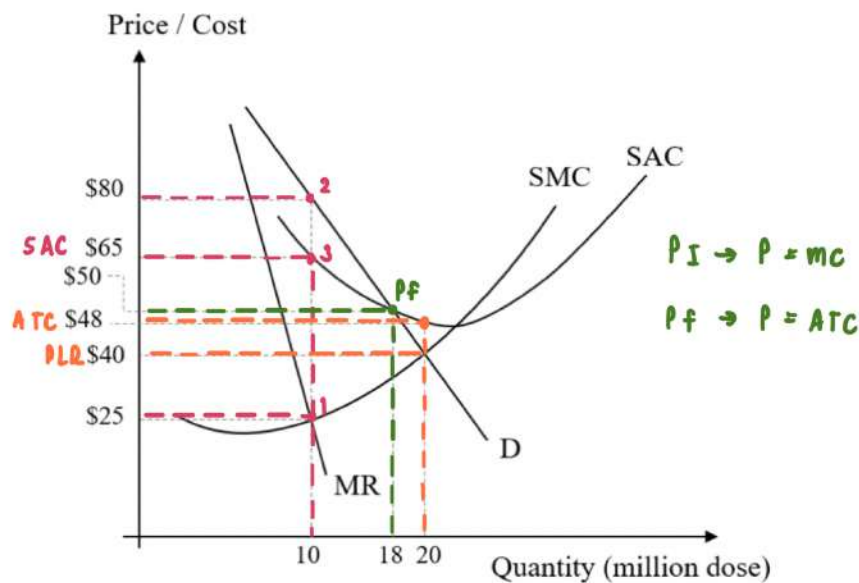
Q^* when there is no new sellers

LR equilibrium $P^*_{LR} =$

$LRMC = \min LRAC$

$LRAC = PLR$

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.



$P_I \rightarrow P = MC$

$P_f \rightarrow P = ATC$

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.a) $Q^*_m = 10$ million doses

$P^*_m = \$80$ per 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?

$$3. b) \quad \pi = (80 - 65) \cdot 10 = \$ 150 \text{ million}$$

$$3. c) \quad Q^*_{m} = 18 \text{ million doses}$$

$$p^*_{f} = \$ 50 \text{ per dose}$$

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?

$$3. d) \cdot Q^* = 20 \text{ million doses}$$

· monopoly faces loss as $ATC > P^*_I$

· government should subsidize = $(ATC - P) \cdot Q^*$

$$= (48 - 40) \cdot 20$$

$$= \$ 160 \text{ million}$$

