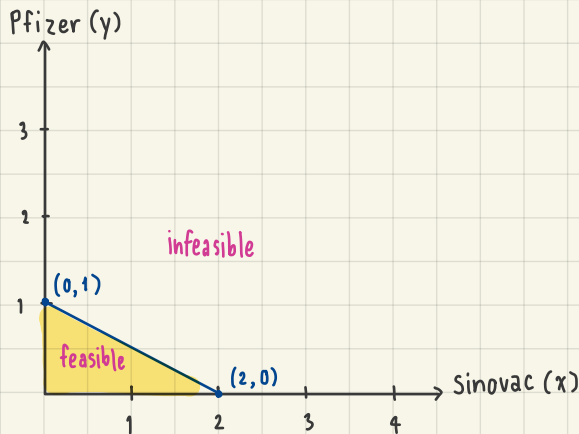


1. Two COVID-19 vaccines are available in Thailand, Sinovac and Pfizer priced at \$20 and \$40 respectively. Assumed that both vaccines are substitutes, answer the following questions clearly.

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.

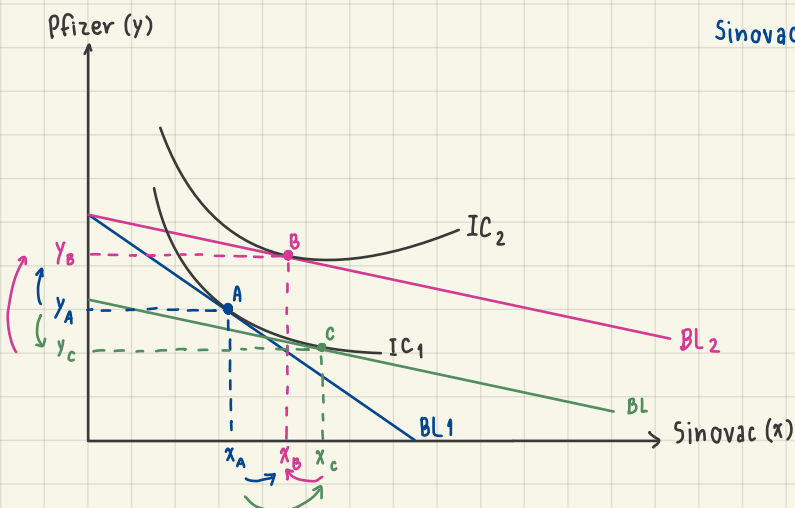


$$\text{Slope} = \frac{P_x}{P_y} = \frac{20}{40} = \frac{1}{2}$$

$$\text{Budget line} \cdot 40 = 40y + 20x$$

∴ The consumer can only get 1 Pfizer or 2 Sinovac.

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.



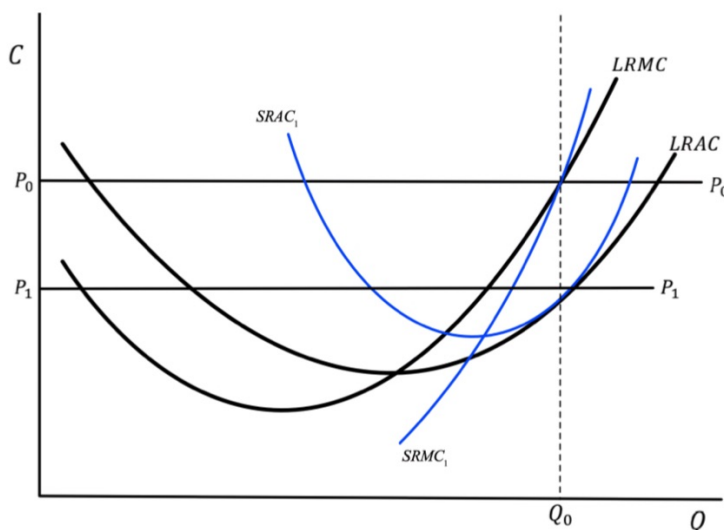
Sinovac price slashed by half
20 \$ → 10 \$

Price effect : When the price of Sinovac decrease, Sinovac become normal good.

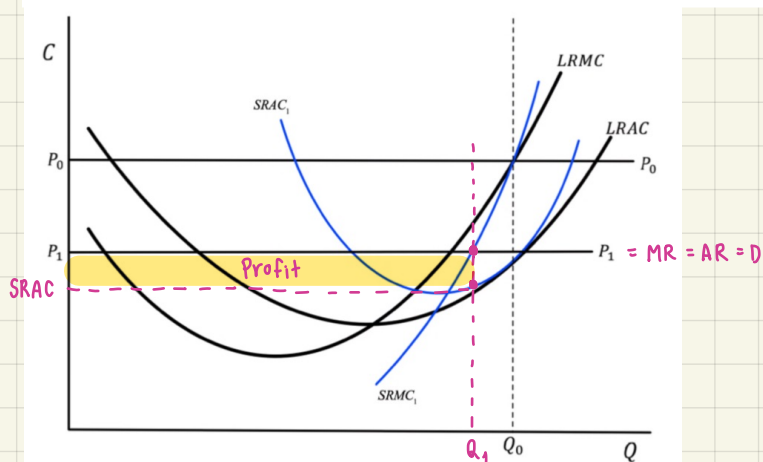
Substitution effect : When the Sinovac price drop, the demand for Sinovac increase and demand less Pfizer to maintain constant utility.

Income effect : When Sinovac price drop, power of buying will rise from BL to BL2.
The consumer will decrease Sinovac as an inferior good, and increase Pfizer as normal 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.



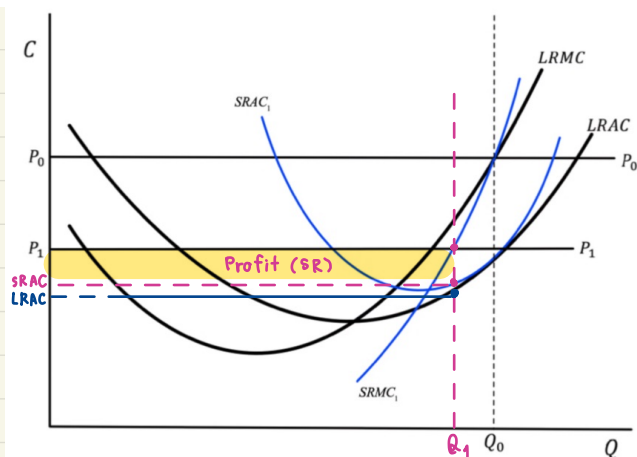
2.a) If the market equilibrium price decreases to P_1 , in the short run according to the given Short-Run cost curves $SRAC_1$ and $SRMC_1$, find the new Short-Run equilibrium quantity Q_1 and profit of the firm. State the equilibrium conditions.



$$MR = MC \quad : \text{Max profit / equilibrium}$$

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

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).



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

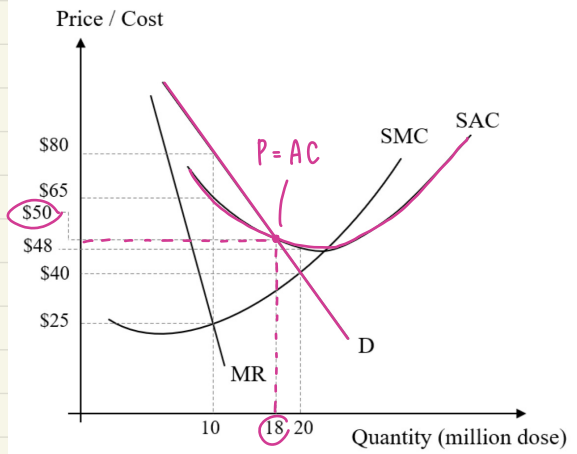
$$\pi_{LR} = (P_1 - LRAC) \cdot Q_1$$

$$LRAC < SRAC$$

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

Profit = 150 \$

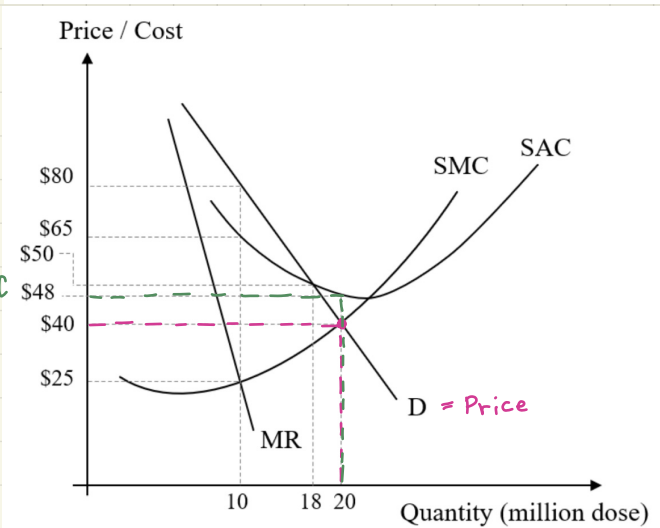
3.c) If the government decides to intervene and set a fair price, how many million doses GPO needs to import and how much the price to be set?



$Q = 18$ million doses

Fair price = 50 \$ 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?



$P = 40$

$AC = 48$

$48 - 40 = 8$ \$ per dose

$Loss = 8 \times 20 = 160$

$\therefore$ Subsidized 160 \$ million