

HW#11, Due May 6, 2021 Analyze the case the firm receives subsidy for the following two different cases to find out how the firm's quantity and profit change.

- The government gives a lump sum subsidy of 20,000 baht to each firm.
- Suppose that the firm was producing 1,000 units and the government gives a subsidy of 20 baht/unit so the total subsidy is also 20,000 baht if the firm does not change its production of 1,000 units. Do you think, to maximize its profit with the subsidy of 20 baht/unit, the firm will increase/decrease its production from 1,000 units? Does the firm receive higher profit? Does the firm receive more/less subsidy than 20,000 bahts?

a. The firm receive a lump subsidy of 20,000 baht so the total fixed cost will decrease

unchanged,  $MC = \text{unchanged}$

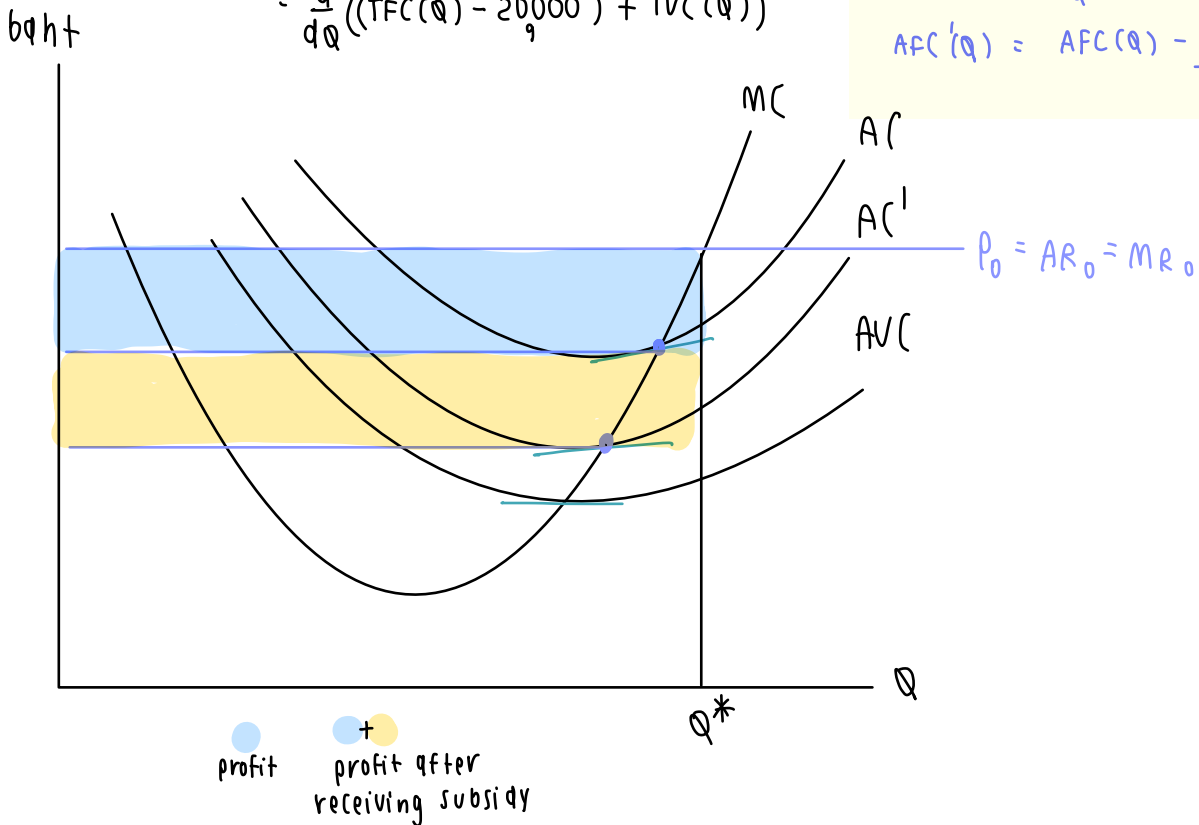
$$TC(Q) = TFC(Q) + TVC(Q)$$

$$\frac{dTC(Q)}{dQ} = TFC'(Q) + TVC'(Q)$$

$$= \frac{d}{dQ} ((TFC(Q) - 20000) + TVC(Q))$$

$$\frac{TFC'(Q)}{Q} = \frac{TFC(Q)}{Q} - \frac{20000}{Q}$$

$$AFC'(Q) = AFC(Q) - \frac{20000}{Q}$$

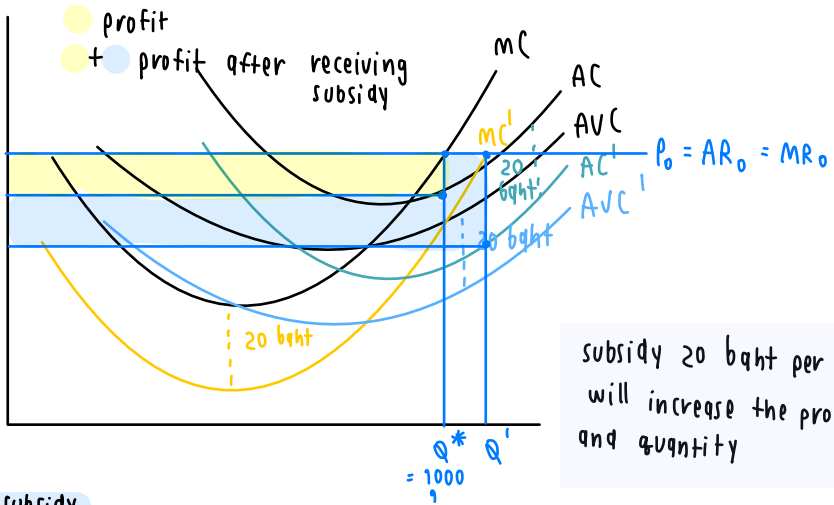


; equilibrium quantity  $Q^*$  does not change because MC and MR don't change.

-  $Q^*$  satisfies the equilibrium conditions but profit increases.

= the amount fixed cost decreases 20,000 baht.

b.) government gives a subsidy of 20 baht/unit (TVC will decrease)



Before subsidy

Equilibrium is at  $Q^*$

- $MR(Q^*) = MC(Q^*)$
- $\text{slope } MR(Q^*) = 0 < \text{slope } MC(Q^*)$

After subsidy

Equilibrium is at  $Q'$

- $MR(Q') = MC(Q')$
- $\text{slope } MR(Q') = 0 < \text{slope } MC(Q')$

$$TC(Q) = TFC(Q) + TVC(Q)$$

$$TC'(Q) = TFC(Q) + TVC'(Q)$$

$$= TFC(Q) + TVC(Q) - 20Q$$

$$AVC'(Q) = AVC(Q) - \frac{20Q}{Q}$$

$$AC'(Q) = AFC(Q) + AVC(Q) - 20$$

$$= AC(Q) - 20$$

$$MC'(Q) = MC(Q) - 20$$

$\therefore$  To maximize its profit, the firm needs to increase the production ( $Q^*$  to  $Q'$ ) to gain more profit and the firm will receive more subsidy (because 20  $Q$ , when  $Q$  increase, the subsidy will also increase) (Subsidy  $> 20,000$ ).