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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.

- a) The government gives a lump sum subsidy of 20,000 bahts to each firm.
b) Suppose that the firm was producing 1,000 units and the government gives a subsidy of 20 bahts/unit so the total subsidy is also 20,000 bahts if the firm does not change its production of 1,000 units. Do you think, to maximize its profit with the subsidy of 20 bahts/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 receives a lump sum subsidy
of 20,000 baht

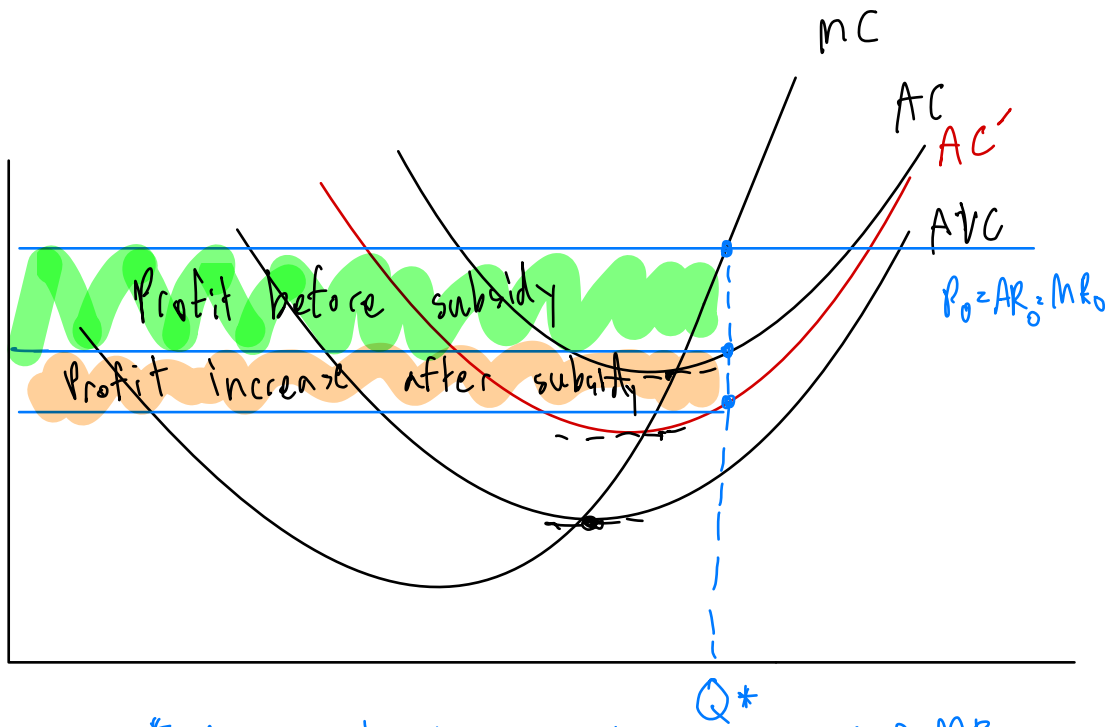
$\Rightarrow$ TFC decreases

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

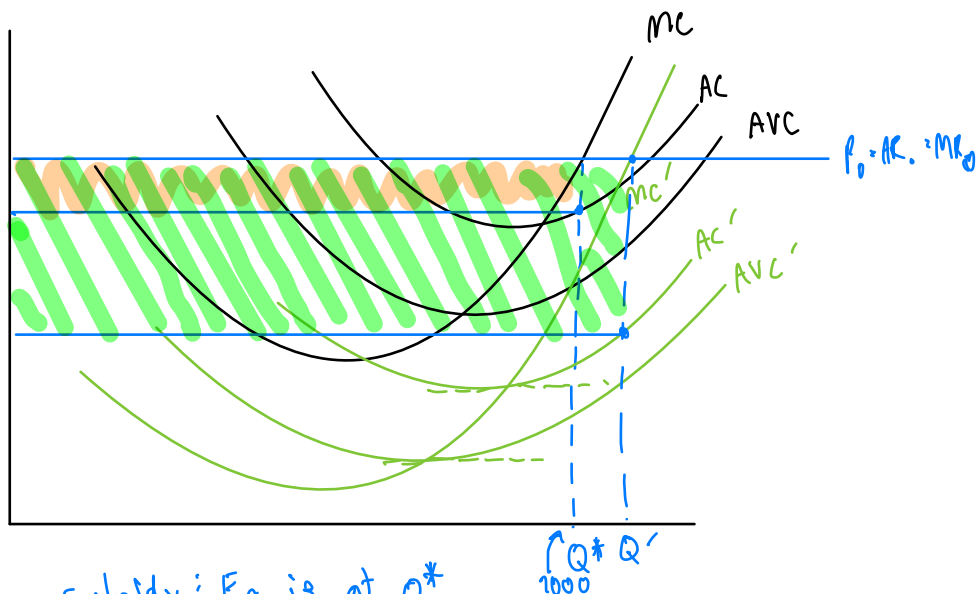
$$\frac{d}{dQ} TC'(Q) = TFC'(Q) + TVC'(Q)$$

$$\Rightarrow \frac{d}{dQ} (TFC(Q) - 20,000 + TVC(Q))$$

$$AFC'(Q) = AFC(Q) - \frac{20,000}{Q}$$



- $\therefore Q^*$ does not change because MC & MR are remain the same
- profit increases
 - the amount of lower fixed cost = 20,000



before subsidy: E_q is at Q^*

where 1) $MR(Q^*) = MC(Q^*)$

2) $\text{slope } MR(Q^*) < \text{slope } MC(Q^*)$

after subsidy: E_q is at Q'

where 1) $MR(Q') = MC'(Q')$

2) $\text{slope } MR(Q') < \text{slope } MC'(Q')$

$$\text{new } TC = TC' = TFC(Q) + TVC(Q) - 20Q$$

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

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

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

$\therefore$ the firm will increase its production to Q' and gain higher profit and receive subsidy more than 20,000 baht because firm will produce more than 1000 units