

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 bahts to each firm.
- 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

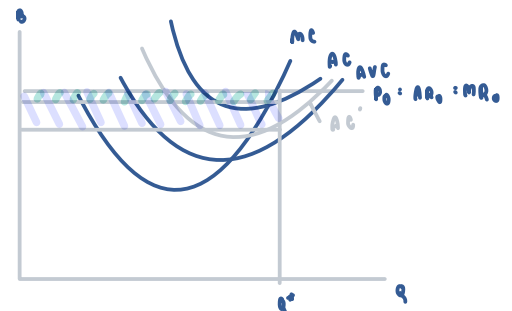
20000 baht : TFC decreases

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

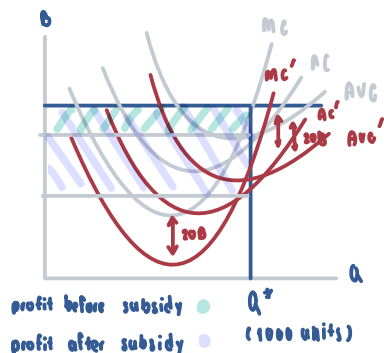
$$TC'(Q) = TFC'(Q) + TVC'(Q) = \frac{d(TFC(Q) - 20000 + TVC(Q))}{dQ}$$

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

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



Eq. quantity Q^* doesn't change because MC and MR also don't change
 • Q^* still satisfied the eq. conditions but profit increases : 20,000



before subsidy : Eq is at Q^*

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

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

after subsidy : Eq is at Q'

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

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

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

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

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

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

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

$$= AC(Q) - 20$$

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

Because the firm wants to maximize the profit, the production is increased (Q')

By this, firm will receive subsidy more than 20,000 baht

However, if the firm produces this much the cost will be skyrocket and result in less revenue

	MR	MC	Marginal
$Q^* - 5$	10	6	4
$Q^* - 4$	10	7	3
$Q^* - 3$	10	8	2
$Q^* - 2$	10	9	1
$Q^* - 1$	10	9.5	0.5
Q^*	10	10	0

subsidy will raise the quantity and profit