

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?

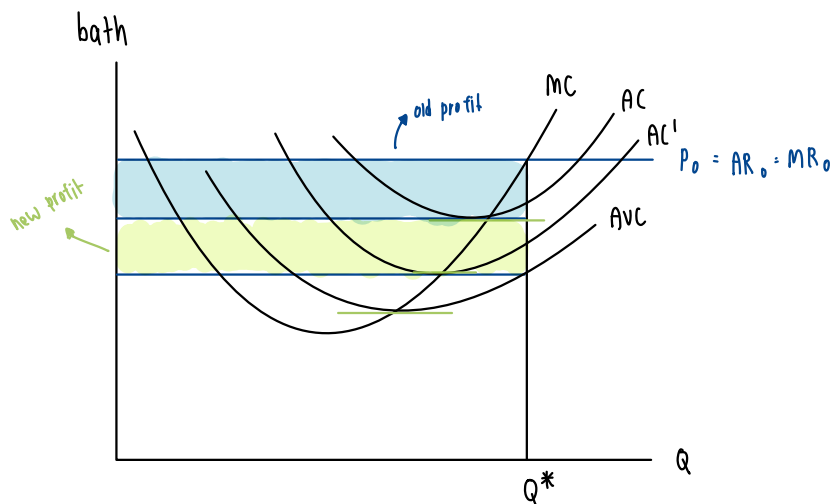
a) The firm receives a lump sum subsidy of 20,000

This means the TFC decreases

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

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

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



$$AV'(Q) = \frac{TFC(Q)}{Q} \Rightarrow \text{unchange}$$

$$MC(Q) = \frac{dTV}{dQ}(Q) + \frac{dTF}{dQ} - \frac{d2000}{dQ}$$

$$= \frac{d}{dQ} TVC(Q) \Rightarrow \text{unchange}$$

$$\text{At point } E, 1) MR(Q^*) = MC(Q^*)$$

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

$\therefore$ The firm produce at the same quantity Q^* and receive more profit.

b) total cost

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

with subsidy : $TC'(Q) = TVC(Q) - 20(Q) + TFC(Q)$

total variable cost

Normally : $TVC(Q) = TV(Q)$

with subsidy : $TVC(Q) = TV(Q) - 20Q$

Average cost

Normally : $AC(Q) = \frac{TVC(Q)}{Q} + \frac{TFC(Q)}{Q}$

with subsidy : $AC'(Q) = \frac{TVC(Q)}{Q} - \frac{20Q}{Q} + \frac{TFC(Q)}{Q}$

Marginal cost

Normally : $MC(Q) = \frac{d}{dQ} TVC(Q) + \frac{d}{dQ} TFC(Q)$

with subsidy : $MC'(Q) = \frac{d}{dQ} TVC(Q) - \frac{d}{dQ} 20Q$

Before subsidy

Equilibrium is at Q^*

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

2. $\text{slope}(Q^*) = 0 < \text{slope } MC(Q^*)$

After subsidy

Equilibrium is at Q'

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

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

