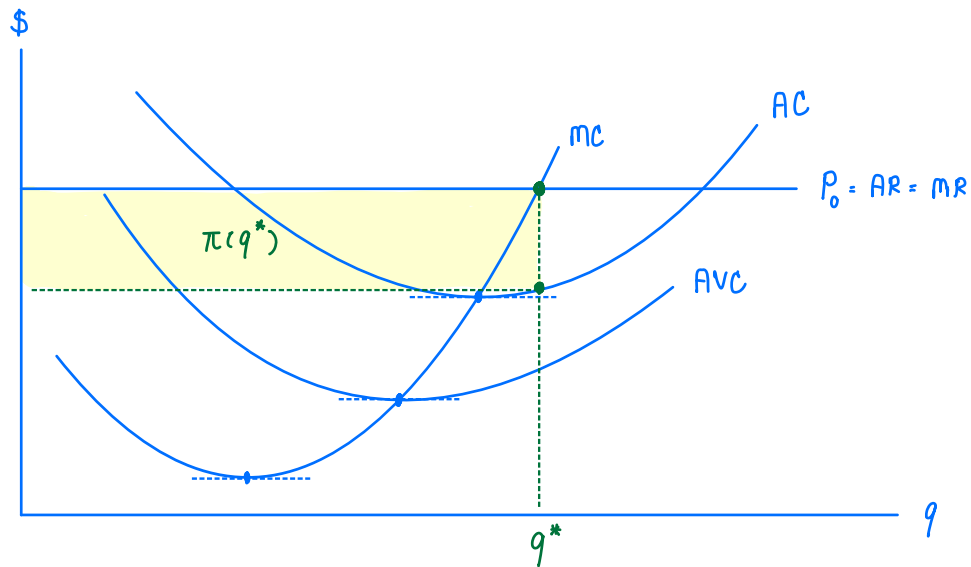


In perfectly competitive market,  $TR(q) = p_0 q \Rightarrow AR(q) = MC(q) = p_0$



The firm is profit-maximizing, thus

$$\pi(q) = TR(q) - TC(q)$$

$$\pi'(q^*) = MR(q^*) - MC(q^*) = 0 \Rightarrow MR(q^*) = MC(q^*)$$

The firm chooses  $q^*$  such that  $MR(q^*) = MC(q^*)$ , and the firm is currently obtains the positive profit since  $AR(q^*) > AC(q^*)$ . The profit of the firm is represented by the yellow-shaded area on the graph above.

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.

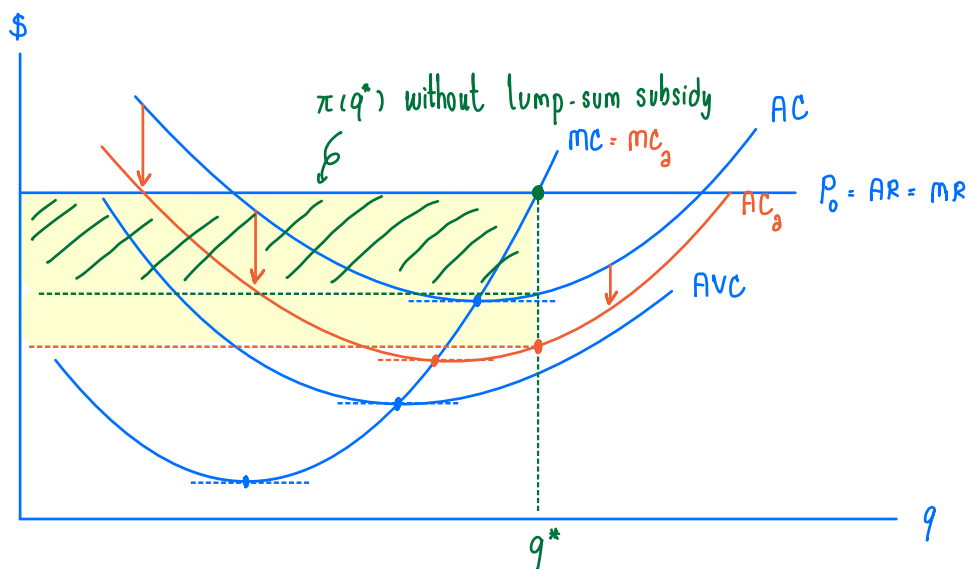
a) When the lump-sum subsidy is given, then

$$TC_g(q) = TFC(q) - \underbrace{S_0}_{\text{Lump-sum subsidy = THB 20,000}} + TVC(q)$$

$$AC_g(q) = AFC(q) - \frac{S_0}{q} + AVC(q) < AC(q) = AFC(q) + AVC(q)$$

$$MC_g(q) = \frac{dTC_g(q)}{dq} = MC(q)$$

we can see that the  $AC_g(q)$  curve will be shifted lower because  $AC_g(q) < AC(q)$  due to the fact that subsidy reduces the fixed cost of the firm. However, the  $MC_g(q)$  remains unchanged, i.e.  $MC_g(q) = MC(q)$



However, the firm still chooses to produce at  $q^*$  since  $MR(q^*) = MC_g(q^*)$ , but now it receives a higher profit compared to the case without lump-sum subsidy.

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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?

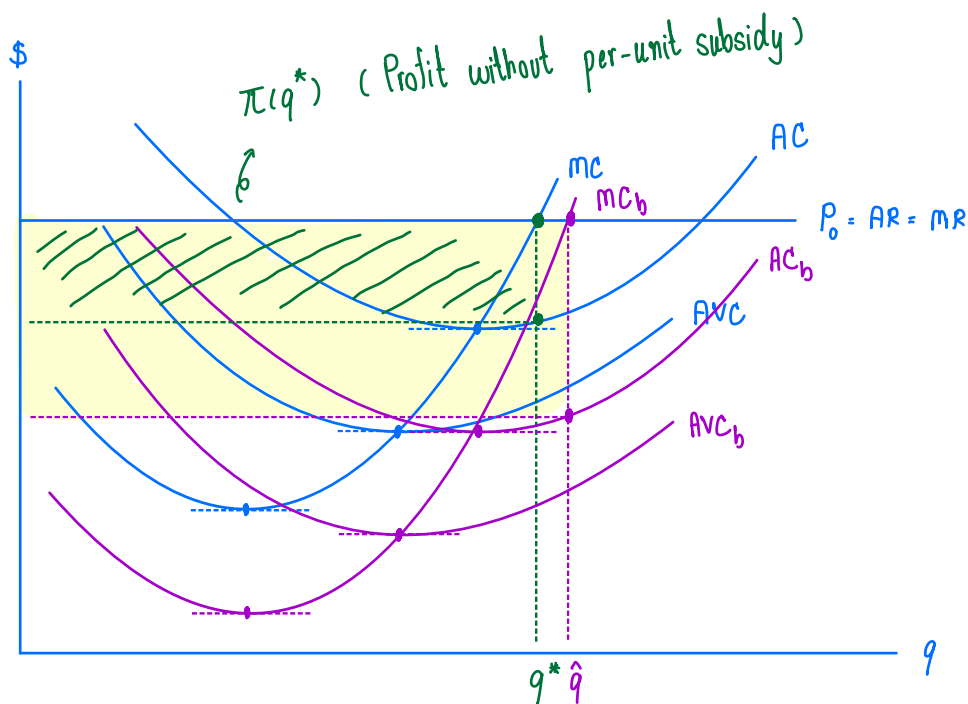
b) When the per-unit subsidy is given,

$$TC_b(q) = TFC(q) + (TVC(q) - S_b q)$$

$$AC_b(q) = AFC(q) + (AVC(q) - S_b) < AC(q)$$

$$MC_b(q) = \frac{dTC_b(q)}{dq} = MC(q) - S_b < MC(q)$$

All cost curves ( $AC_b(q)$ ,  $MC_b(q)$ ,  $AVC_b(q)$ ) will be shifted lower than before.



Suppose, without the  $S_b = \text{THB} 20$  per unit subsidy, the firm produces  $q^* = 1,000$  units so that its profit is maximized.

Then, when per-unit subsidy is implemented, the firm no longer maximizes its profit at  $q^* = 1,000$  units since  $MR(q^*) > MC_b(q^*)$ . The firm has an incentive to produce more, thus, the firm produces at  $\hat{q} > q^* = 1,000$  units instead because  $MR(\hat{q}) = MC_b(\hat{q})$ .

Moreover, the firm obtains a higher profit compared to the case when there is no subsidy. As the firm produces more than 1,000 units, the firm actually gets the (total) subsidy more than THB 20,000. #