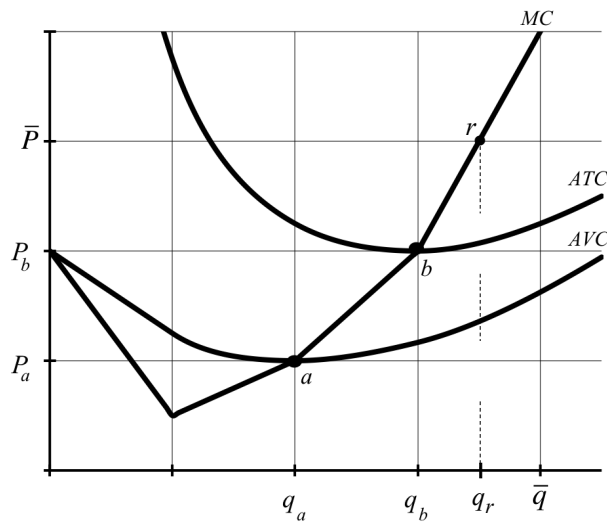


**COMPETITION**

In the last handout we saw that two firms will engage in a price war under the conditions given. To discover how the price war will end we need to understand what the economist refers to as a price-taking firm, defined by the two conditions below. Since  $Q$  is total output in the market, now use  $q$  for one firm's output.

- Price-taking firm– ① The firm cannot (or will not) change price from current  $P$ .  
 ② The firm can sell more than it wishes to sell at current price.



Suppose that a price-taking firm's current price is  $\bar{P}$  and that it can sell  $\bar{q}$  if it wishes to at that price. But will it wish to sell to all  $\bar{q}$  customers? What if it decided, however, to only sell  $q_a$ ? Then it will have many customers that it will not sell to but who want to buy from it. If it decided to sell to one more customer, then it can sell to that customer for exactly  $\bar{P}$  – it does not have to do anything to

attract that customer (such as lower price or advertise). Therefore its  $MR$  is exactly  $\bar{P}$ . We know that profit is maximized where  $MR = MC$  – which is  $\bar{P} = MC$  for the price taking firm and is at point  $r$ . The firm will sell  $q_r$  to maximize profit.

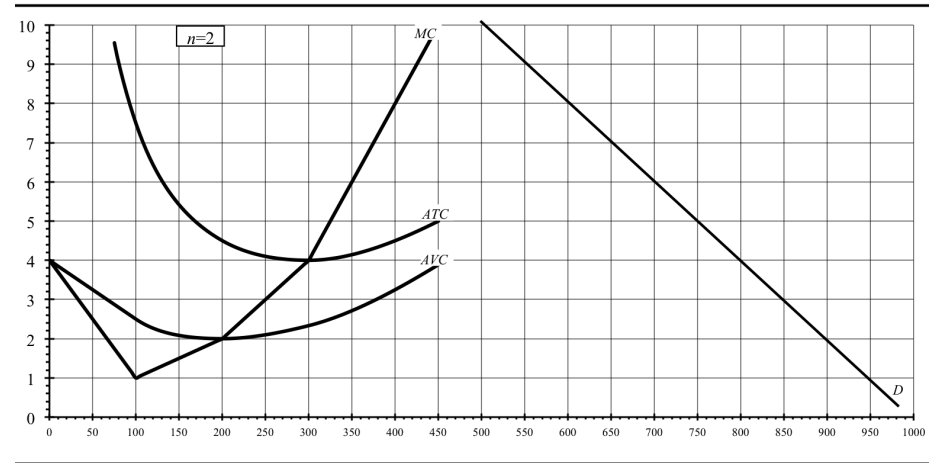
The Relevant Portions of  $MC$  for the price-taking firm

Does the  $P=MC$  rule apply when there are profits OR losses?

- ① If  $P > P_b$  then maximize  $SR$  profits where  $P = MC$ .
- ② If  $P = P_b$  then break even where  $P = MC$  ( $q = q_b$ ).
- ③ If  $P_a \leq P < P_b$  then minimize  $SR$  losses where  $P = MC$ .
- ④ If  $P < P_a$  then shut down in the  $SR$  ( $q = 0$ ).

If firm is NOT making a loss – rules ① and ② apply.  
 If the firm is making loss ( $P < P_b$ ) – in the long run the firm will leave the industry. However, they cannot leave in the short run and must continue to pay  $TFC$ . If they choose to produce nothing ( $q=0$ ), then their losses will be equal to  $TFC$  (because  $TR=0$  and  $TVC=0$ ). But if producing and selling some output will more than cover  $TVC$  then they can reduce losses to less than  $TFC$  by producing  $q > 0$ . Rules ③ and ④ show how to minimize losses. Therefore only the range of  $MC$  above  $a$  is relevant.

Now consider a case where we have two identical firms selling this product, current price is  $\bar{P}$  and they can each sell  $\bar{q}$  if they wish to at  $\bar{P}$ . Then they each would maximize profit by selling  $q_r$ . Therefore, the two of them together would like to sell  $2q_r$ , which is the quantity supplied in the market – the amount that the sellers would like to sell at  $\bar{P}$ . We can get the quantity supplied at any other price merely by doubling the horizontal distance up to the  $MC$  curve. Therefore the supply curve is merely the  $MC$  curve “multiplied by 2” above minimum  $AVC$ . An example for two firms ( $n=2$ ) is given below. The demand curve for the two firms is also given.



If there were three identical firms ( $n=3$ ) in the market then we would find  $S$  by multiplying  $MC$  by 3 in the diagram above. However, we would be able to show less of the  $S$  curve and then even less as  $n$  increases further. Thus we usually divide the analysis into two diagrams as shown below ( $n=20$ ). Using our supply-demand analysis we can find equilibrium in the diagrams above and below.

