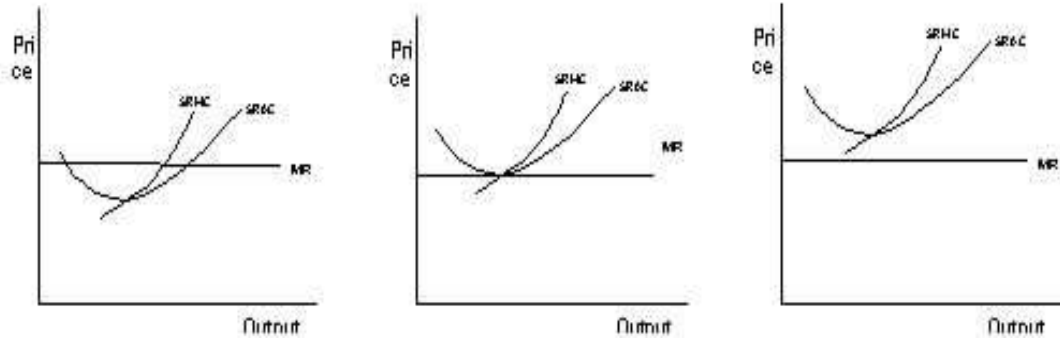# Economics 10: Problem Set 4 (With Answers)

1. Draw 3 figures showing a firm

(a) making supernormal profit; (b) breaking even; (c) making losses.


1. Assume a new innovation is developed that reduces the cost of production for firms. What would be the effects on a competitive industry in the short and long runs?

Innovation reduces firms' costs, therefore AC and MC curves shift down. Firms start earning positive economic profits in the short run (see figure below). Therefore, new firms are attracted by positive economic profit opportunity.
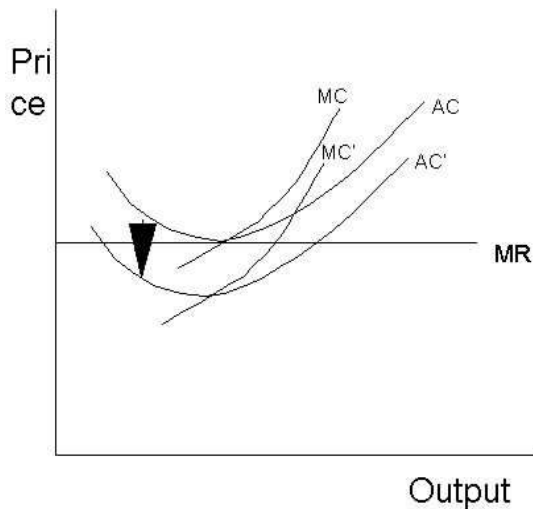
Because of it, and because the industry supply curve is a sum of individual firms' MC curves (above the minimum of AVC), the industry supply curve shifts outward to the right (i.e., increase in supply). Price drops, and the process continues until new price is equal the minimum of AC curve – zero profit in long run (see a picture below).
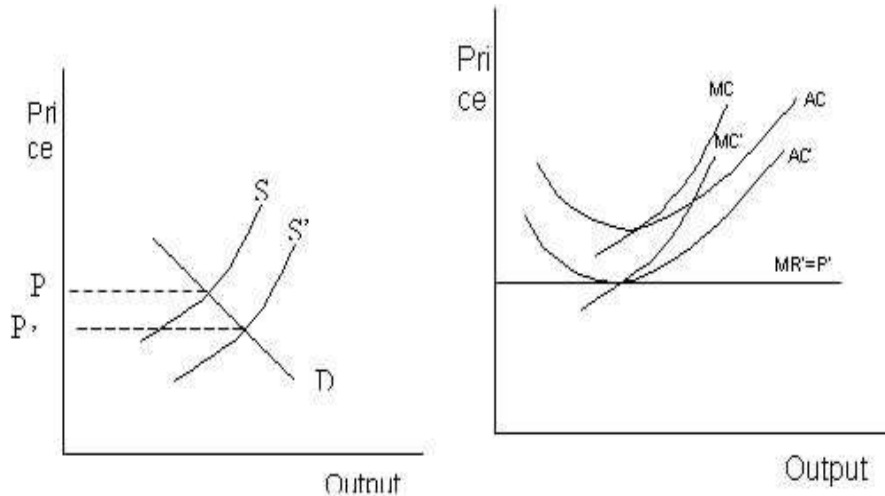
Note: First, MC curve falls, and each firm chooses a new level of output given initial price. Only then, after increased quantities hit the market, we may say about a shift in the industry supply curve (which reduces the market price). So, first individual MC curve shifts, then industry S curve shifts.

3. Why will a firm continue to operate in the long run earning zero profits?

Zero economic profit means the normal, economy-wide rate of profit in the accounting sense. While calculating the economic profit, we include the opportunity costs of all inputs, even those owned by a firm. Zero economic profit just means that a firm earns the same rate of return on its capital as a rate of return elsewhere.

1. Explain why a competitive firm's demand curve is also its marginal revenue and its average revenue curve.

In a competitive environment, each firm is a price-taker – it can sell any amount of output at the market price. That is, each firm's demand curve is a horizontal line at the level of P, the market price of a good. If a firm sells one more unit of output, its extra revenue is equal to the price of the good. Therefore, D=P=MR. Also, since the price do not change whatever is a firm's output, the firm's total revenue is TR=P*Q, so its average revenue is AR=TR/Q=P. Hence, D=MR=AR for each firm.

5. Firm 1 and Firm 2 are oil refineries. Firm 2 owns its own oil well and uses its own oil. Firm 1 buys oil from an external source.

Can we draw the long-run average cost curves for Firm 2 as shown in the figure?

As long as we assume that both firms use the same technology for refining (and that the Firm 2 uses the best available technology for extracting oil), the picture is incorrect – AC curves and MC curves should be identical for both firms. Firm 2 has an opportunity cost of not selling the extracted oil – it refines the oil instead – and this opportunity cost is equal to the cost of purchasing oil by Firm 1. Hence, total opportunity costs are the same for both firms, and, correspondingly, AC and MC are the same – as that for

Firm 1 on the figure above (if we assume that there is a long-run equilibrium).

Of course, Firm 2 makes bigger profit in the accounting sense, since it does not buy raw oil. However, zero economic profit indicates that both firms do the best they can. If we imagine, for instance, that Firm 2 uses expensive labor and old equipment for refining, it still makes more money than the Firm 1 in accounting sense. However, Firm 2 could in this case make even more money by selling its own oil and by investing money it puts into refining somewhere else. Therefore, Firm 2 makes economic losses if it refines oil, even though it makes an accounting profit.
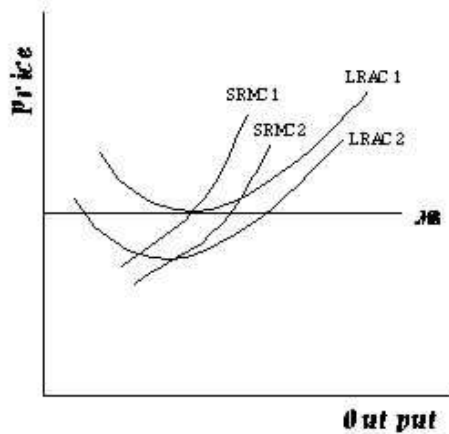
Essay question from a previous examination:

A news report this week states that the world renowned Joffrey Ballet company, currently on a multi-city tour, is in grave financial difficulties with revenue not covering the total costs of operation. Management of the ballet is seriously considering cutting the tour short, thereby ending the 1994 season early, in order to cut costs. Ending the tour would mean that the dancers would cease to get their pay; however, the company would still have to pay costs such as rent on its headquarters, salaries of administrative and managerial staff, interest on outstanding loans, etc. As an economic analyst, would you advise the company to cut the tour short or continue to its end. Why? Be as specific as possible and use the appropriate graphs (if necessary) to explain your answer.

We assume that a market for the ballet is competitive (alternatively, we can assume that Joffrey Ballet company can give as many performances <u>in different cities</u> as it wishes without influencing "the price of a good" – revenue from one performance). Variable costs for the company are payments to dancers, and the fixed costs are rent payments, salaries of various staff, interest rate on loans, etc. If the "price" is higher than the minimum of AVC, the company should continue the tour until the revenue from the marginal performance equals the costs of making this performance, i.e., until MR=MC. If, however, the revenue from each show does not cover even AVC, it is better to stop the tour right away (see a picture below).