

Answers to Homework # 6

Answer questions 9.5, 9.14, and 9.16 on page 272 and 273 of the textbook. Show all of your calculations for question 9.5 by providing a table like the one on page 246 of the textbook. State the firm's most profitable output and how large profit is, if the price of *all* variable inputs increase by 50%. Should the firm remain open in the short-run? in the long-run? Carefully explain.

Answer to 9.5

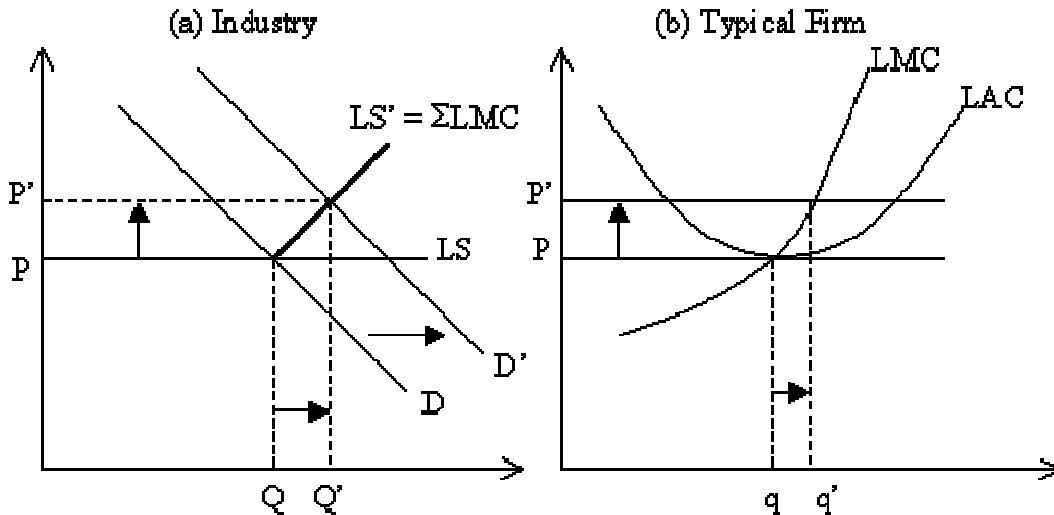
If the price of all variable inputs increased by 50%, then all the values in the TVC column in Table 9.1 would increase by 50%. TC would increase by the amount TVC increased, and MC would increase by 50%. On a graph MC, AC, and AVC would all shift up while MR remains constant. The profit-maximizing output level would fall to 5 units because the MC of the 5th unit increases to \$12, which is equal to price. This is shown in the table below.

AC is now greater than price so the firm is losing money, but should remain open in the short-run because price still exceeds AVC. The firm would lose the entire fixed cost of \$15 by shutting down immediately. By staying open in the short-run, the firm generates \$1.50 in revenues above variable costs. This \$1.50 can go toward the payment of the fixed cost which reduces the loss to \$13.50. The firm should plan to close in the long-run after the fixed costs expire.

q	P	TR	TC <sub>1</sub>	TVC <sub>1</sub>	AC <sub>1</sub>	AVC <sub>1</sub>	Profit <sub>1</sub>	Profit <sub>1</sub> /q	MC <sub>1</sub>	MR
0	12	0	15.00	0.00	---	---	-15.00	---	---	---
1	12	12	30.00	15.00	30.00	15.00	-18.00	-18.00	15.00	12
2	12	24	42.00	27.00	21.00	13.50	-18.00	-9.00	12.00	12
3	12	36	52.50	37.50	17.50	12.50	-16.50	-5.50	10.50	12
4	12	48	61.50	46.50	15.38	11.63	-13.50	-3.38	9.00	12
5	12	60	73.50	58.50	14.70	11.70	-13.50	-2.70	12.00	12
6	12	72	87.00	72.00	14.50	12.00	-15.00	-2.50	13.50	12
7	12	84	102.00	87.00	14.57	12.43	-18.00	-2.57	15.00	12
8	12	96	119.85	104.85	14.98	13.11	-23.85	-2.98	17.85	12
9	12	108	139.50	124.50	15.50	13.83	-31.50	-3.50	19.65	12
10	12	120	162.00	147.00	16.20	14.70	-42.00	-4.20	22.50	12
11	12	132	190.50	175.50	17.32	15.95	-58.50	-5.32	28.50	12

Answer to 9.14

In this case where new firms cannot enter and the cost curves do not shift as the industry expands, the curve showing the long-run response to an increase in demand is the sum of the existing firms' LR marginal cost curves. The industry in panel a expands along  $LS'$ , and the final equilibrium involves a higher price. In panel b, a typical firm produces where  $P' = LMC$  and makes an economic profit that is not competed away since new firms cannot enter.



Answer to 9.16

- a. If the union establishes a wage above the competitive level, the costs of production increase and supply will fall. Thus, the long-run supply curve will shift inward.
- b. This shifts the consumer demand curve inward and has no effect on the long-run supply curve.
- c. A change in production technology is required to protect the apples from the pest invasion. Supply will fall because the costs of production increase. Thus, the long-run supply curve will shift inward.
- d. This new law alters the production technique by increasing the amount of land required for producing apples. The higher costs of production will shift the long-run supply curve inward.
- e. Quantity supplied would fall in the long run as some farmers leave the industry, but a reduction in the price of apples does not shift the long-run supply curve of apples.
- f. The supply of an input (i.e., apple pickers) shifts outward, reducing production costs. This leads to an outward shift of the long-run supply curve of apples.
- g. A change in government regulations (e.g., min.wage legislation) that raises production costs will shift the long-run supply curve inward.