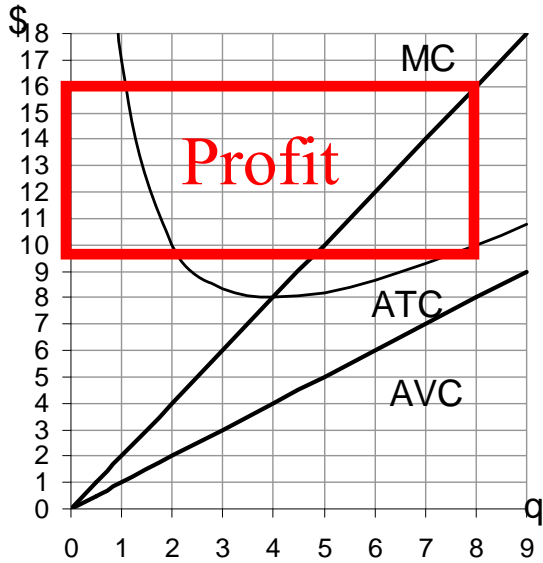


Econ 1101
Practice Questions about Supply in the Short and Long Run: (Solution)

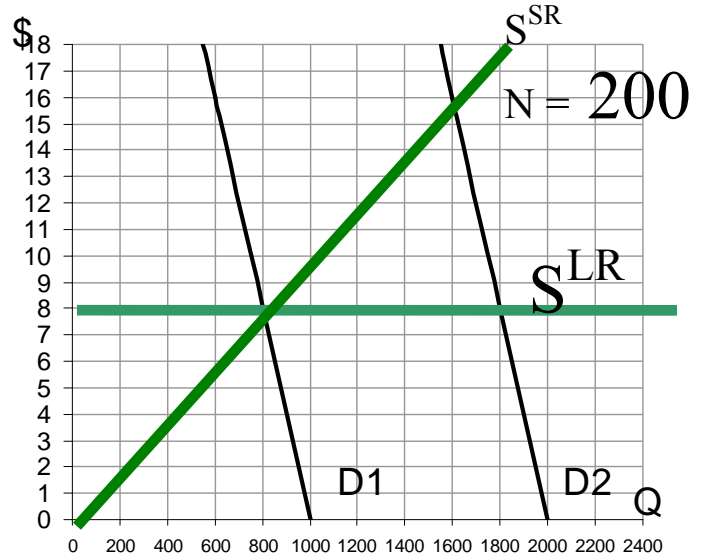
1. Under what three assumptions will the long-run supply curve for the widget industry be perfectly elastic (i.e. perfectly flat)

- x. The same technology is available to all firms.
- .. The average total cost is falling (economies of scale) over the entire range of Q.
- x.. There are no barriers to entry in the industry.
- x. Input prices do not change as the industry expands
- .. The marginal revenue of the firm is greater than the price.

2.
Each widget firm has the cost structure illustrated in the figure below on the left. Two different cases for industry demand are illustrated in the figure below on the right. Please use the gridlines in the graph to determine the numbers you need to do the problem. For example, you should be able to see in the figure that ATC at $q = 2$ is \$10.



Cost Structure of Firm



Industry Level Variables

(a) Explain how you can tell from the graph of the firm's cost structure that the fixed cost must be \$16.

We know that $ATC = AFC + AVC$.

From the graph, we can see that at $q = 8$, $ATC = 10$, and $AVC = 8$.

This means that at $q = 8$, $AFC = 2$. Since $AFC = FC/q$, we have that $2 = FC/8$, so $FC = 16$.

(A similar argument can be made by looking at $q = 1$ or $q = 4$.)

(Another (similar) explanation: $TC = FC + VC \Rightarrow FC = TC - VC$. At $q=8$, $ATC=10$, so $TC = 80$. At $q=8$, $AVC=8$, so $VC=64$. Thus, at $q=8$, $FC = 80 - 64 = 16$.)

(b) Draw in the long-run supply curve on the right-hand side graph.

(c) Two possibilities for demand are illustrated on the right, a low demand curve D1 and a high demand curve D2. Determine the long-run competitive equilibrium for each case by completing the table below (Use whole numbers only, e.g. 4 or 5, etc. Do not put in units, only the number):

| | | Demand | |
|-----------------|---|---------------|-----------|
| Variable | Definition | D1 | D2 |
| P^{LR} | Long-run Industry Price (\$) | 8 | 8 |
| Q^{LR} | Long-run Industry Quantity (# of units) | 800 | 1800 |
| q^{LR} | Long-run output per firm (# of units) | 4 | 4 |
| N^{LR} | Long-run number of firms | 200 | 450 |

(d) Suppose demand is initially at D1 and the industry is in long-run equilibrium. Draw in the short-run industry supply curve in the right figure.

(e) The industry is in long-run equilibrium at D1. There is then a shocking discovery that widgets can be put right into gas tanks to provide a clean-burning environmentally-friendly fuel! This shifts the demand curve to D2. In the short run, the number of firms is fixed at 200. The new short-run equilibrium price 16 dollars and the short-run industry quantity of widgets is 1600 units. In the new short-run equilibrium each firm produces 8 units where the average total cost is 10 dollars. The profit of each firm is $(16 - 10) \cdot 8 = 48$ dollars.

(f) Illustrate the short-run profit the left-hand side figure.

(g) In the long run, there will be entry in response to the shift in demand. The **change** in the long-run number of firms is 250 firms. (This equals the 450-200.)

3. (Answer True or False) Suppose demand shifts to the right like above. The effect on equilibrium price is bigger in the short run than the long run. And the effect on equilibrium quantity is smaller in the short run than the long run.

True