Lecture #12: Ch 13, pp. 326-333.

I. Competitive firm’s supply curve.

II. Competitive equilibrium.
   A. Long-run price.
   B. Long-run profit.

III. Economies of scale (ATC is falling).

IV. Cost Table: An Example.

I. Competitive firm’s supply curve.

A firm’s supply curve shows how much output a firm will produce at each price. A competitive firm produces output where the price is equal to the marginal cost \( P^* = MC \). Therefore, a competitive firm’s short-run supply curve is equal to the portion of its marginal cost curve (MC) that is above average variable cost (AVC). If the price is below the average variable cost curve (AVC), then the firm will produce nothing.

\[
\pi = q^*(P^* - ATC) = 0
\]
II. Competitive equilibrium.

If the price is $P_1$, firms will earn an economic profit. Economic profit will attract new firms into the market, shifting down the supply curve and lowering the price. If the price is $P_3$, firms will earn an economic loss. Economic loss will drive firms out of the market, shifting the supply curve up and increasing the price. If the price is $P_2$, then firms will earn zero economic profit. Firms will not enter or exit the market.

A. Long-run price.

The long-run competitive price is equal to the minimum of the firm’s average total cost curve (ATC).

B. Long-run profit.

In the long-run competitive equilibrium, firms earn zero economic profit.
III. Economies of scale (ATC is falling).

Economies of scale mean that the average total cost (ATC) is falling. Diseconomies of scale means that average total cost (ATC) is rising.

In the region of economies of scale, a firm can double its output without doubling its total cost. Said another way, if the firm doubles its total cost, it can more than double its output.

For example, the firm above can produce 2 units for a total cost of 20 (q x ATC). If the firm doubles its output to 4, then its total cost would increase to 24. The firm doubled its output, but less than doubled its total cost. That is what is meant by economies of scale.

If the firm produces 6 units of output, its total cost is 30. If the firm doubles its output to 12, then its total cost would increase to 216. The firm doubled its output and more than doubled its total cost. That is what is meant by diseconomies of scale.
IV. Cost Table: An Example.

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<th>TC</th>
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<th>VC</th>
<th>ATC</th>
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Given the numbers in **bold**, you can fill in the rest of the numbers. How?

A. If the firm above operates in a perfectly competitive market where the equilibrium price is $40 how much output should it produce in the short-run? What will be its short-run profit or loss? What should the firm do in the long-run?

\[ q^* = 7. \]
\[ \pi = TR - TC = (40)(7) - 280 = 280 - 280 = 0. \]
This firm earns zero economic profit.
It should continue to produce 7 units in the long-run.

B. If the firm above operates in a perfectly competitive market where the equilibrium price is $20 how much output should it produce in the short-run? What will be its short-run profit or loss? What should the firm do in the long-run?

1. \( P = MC \Rightarrow q^* = 5. \)
2. \( MC \) is rising. (yes). (3) Is \( P > AVC? \) (no)

The firm should shut-down now (\( q = 0 \)).
If the firm operates: \( \pi = TR - TC = (20)(5) - 210 = 100 - 210 = -110. \)
The operating loss ($110) is greater than the fixed costs ($60).