Long-Run Costs

AP Microeconomics | Unit 3 | the LRATC curve, economies and diseconomies of scale

Running example. The cost of one loaf: \$10 in a small neighborhood bakery, \$6 in a medium factory bakery, \$10 in a giant company with 40 factories.

1. Short run vs long run

Short run	at least one input is fixed	there are fixed costs
Long run	*all* inputs are variable	there are **no** fixed costs

The long run is not a number of months: it is however long it takes to change every input (build a bigger plant, move, or close).

2. The long-run average total cost curve

Each plant size has its own short-run ATC curve. In the long run the firm chooses the plant size that is cheapest for the output it wants.

LRATC

The lowest average total cost at each level of output, across all possible plant sizes. It wraps around the bottom of the short-run ATC curves (an *envelope*).

3. Economies and diseconomies of scale

Economies of scale	LRATC falls as the firm grows	specialization, bulk buying, better machines
Constant returns to scale	LRATC is flat	size does not change unit cost
Diseconomies of scale	LRATC rises as the firm grows	hard to manage and coordinate

Minimum efficient scale: the smallest output at which LRATC reaches its minimum. Large relative to the market ⇒ a few big firms; small ⇒ many small firms.

4. Not the same as diminishing returns

	Diminishing marginal returns	**Diseconomies of scale**
Time frame	short run	long run
What changes	one input, another is fixed	all inputs together
What rises	MC and short-run ATC	long-run ATC

Returns to scale from data. A firm doubles all of its inputs. If output more than doubles (say, triples), cost per unit falls: increasing returns, economies of scale. If output exactly doubles: constant returns. If it less than doubles: decreasing returns, diseconomies of scale.

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5. Reading the envelope

Each plant's short-run ATC touches LRATC at one output, and there the two curves have the same slope: a firm producing where LRATC is falling is on the falling part of its own SRATC, and one producing where LRATC is rising is on the rising part. Moving to a bigger plant along the falling part of LRATC gives an SRATC that lies lower and to the right, with a lower minimum. If LRATC is still falling at a plant's own minimum, there are still economies of scale: a larger plant would lower average cost further. Producing much more with the current plant pushes ATC far above what a larger plant could achieve. When LRATC falls over the whole market's output, splitting the market raises costs: if the market buys 300 loaves, one firm makes them at \$6 each, while two firms making 150 each pay \$8.25 a loaf, a smaller and less efficient scale.

Where students lose points

1. Explaining a rising LRATC with diminishing marginal returns.
2. Saying there are fixed costs in the long run.
3. Economies of scale means LRATC falls, not that total cost falls.
4. Treating the long run as a fixed number of years.
5. Mixing up "returns to scale" (output) and "economies of scale" (cost).

Now practise it

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