Elements of Microeconomics

AS.180.102 (03)

Chapter 14

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March 28, 2025

Outline

- Paraphrasing Mankiw: Chapter is boring and technical.
- Differences between *economic* and *accounting* costs and profits.
- Different kinds of costs and how these costs vary based on output and time scale.

Firms' Goal

- **Total revenue** is all the money coming in.
  - TR = P*Q
- **Total cost** is the total *opportunity cost* faced by a firm
  - *Economic* costs include explicit and implicit costs
  - Different from *accounting* costs which only include explicit costs
  - Firms (and economists) are interested in the economic costs
- Firms maximize total profits
  - Total profit = TR - TC

Example

- Consider a bike shop which sells and repairs bicycles.
- What are some of the shop's *accounting* costs?
- What are some of the shop's *economic* costs?

Example

- Consider a bike shop which sells and repairs bicycles.
- What are some of the shop's *accounting* costs?
  - Wages and benefits for workers
  - Cost of supplies for bike repairs
  - Rent/mortgage/upkeep on the store space
- What are some of the shop's *economic* costs?
  - Shop owner's foregone wages at another job
  - Interest they could earn if they put their money in a bond instead

Example

- Usually, we assume that in the short run capital is fixed and other inputs are variable.
- What capital does the bike shop have?
- Which costs mentioned before might be variable in the long run?

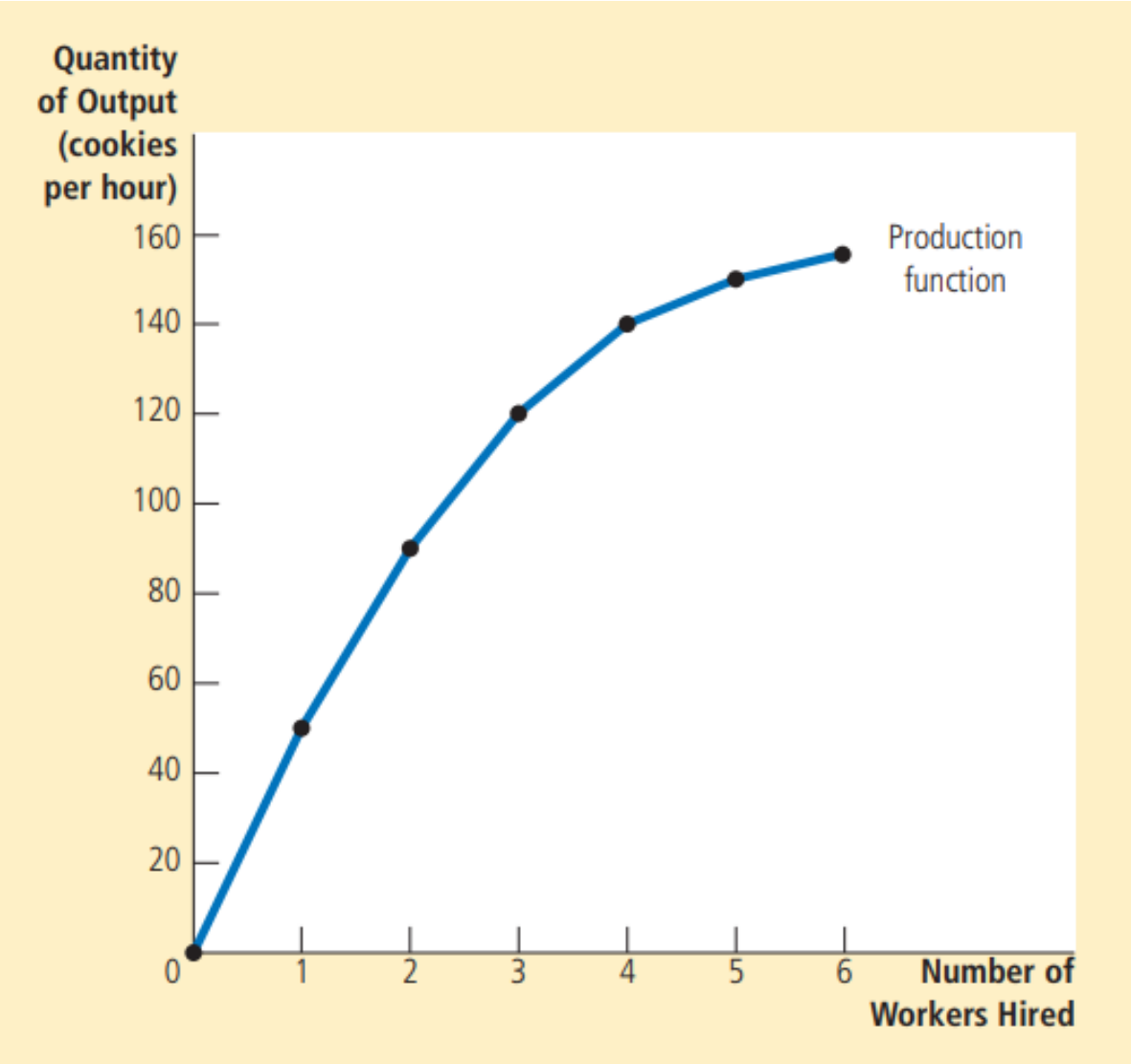
Example

- Usually, we assume that in the short run capital is fixed and other inputs are variable.
- What capital does the bike shop have?
  - The store/repair space
  - Repair equipment
- Which costs mentioned before might be variable in the long run?
  - Location/size
  - Rent/mortgage
  - Wages for workers

Production Function

- The production function tells us how much output a firm is able to produce with a given level of inputs
- Can derive the *marginal product* of an input: how much does output change from a "small" (1 unit) increase in an input?
- This is usually not linear, so that marginal product is different at different levels of input.
- At some point, most inputs exhibit *diminishing marginal product*: each additional unit of input increases output by less than the previous input.

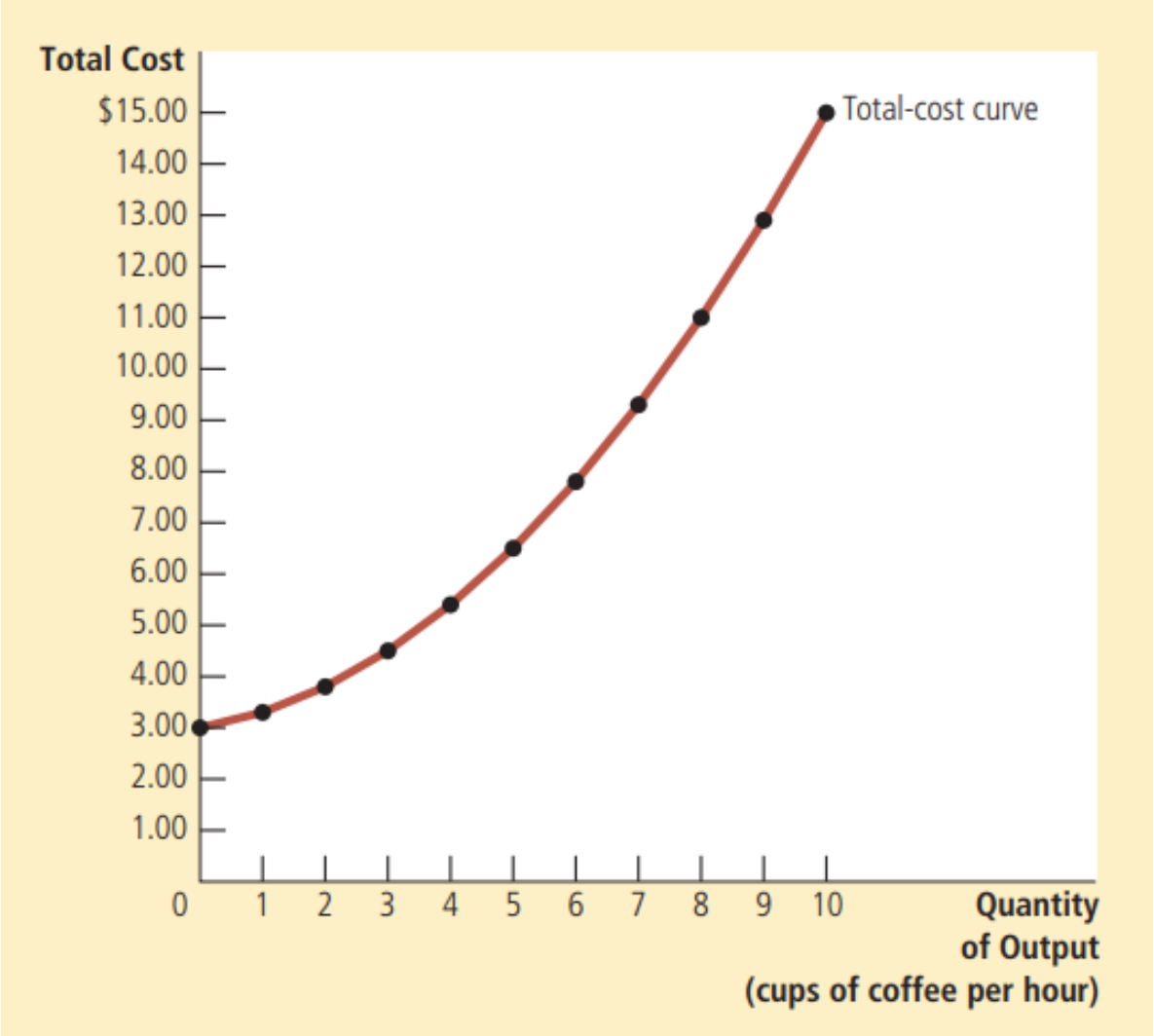
Diminishing Marginal Product of Labor



Total Costs

If marginal product is decreasing, what happens to total costs as output goes up?

Diminishing Marginal Product of Labor



Fixed vs. Variable Costs

- Fixed costs are the same no matter how much output the firm produces
- Variable costs depend on the level of our output

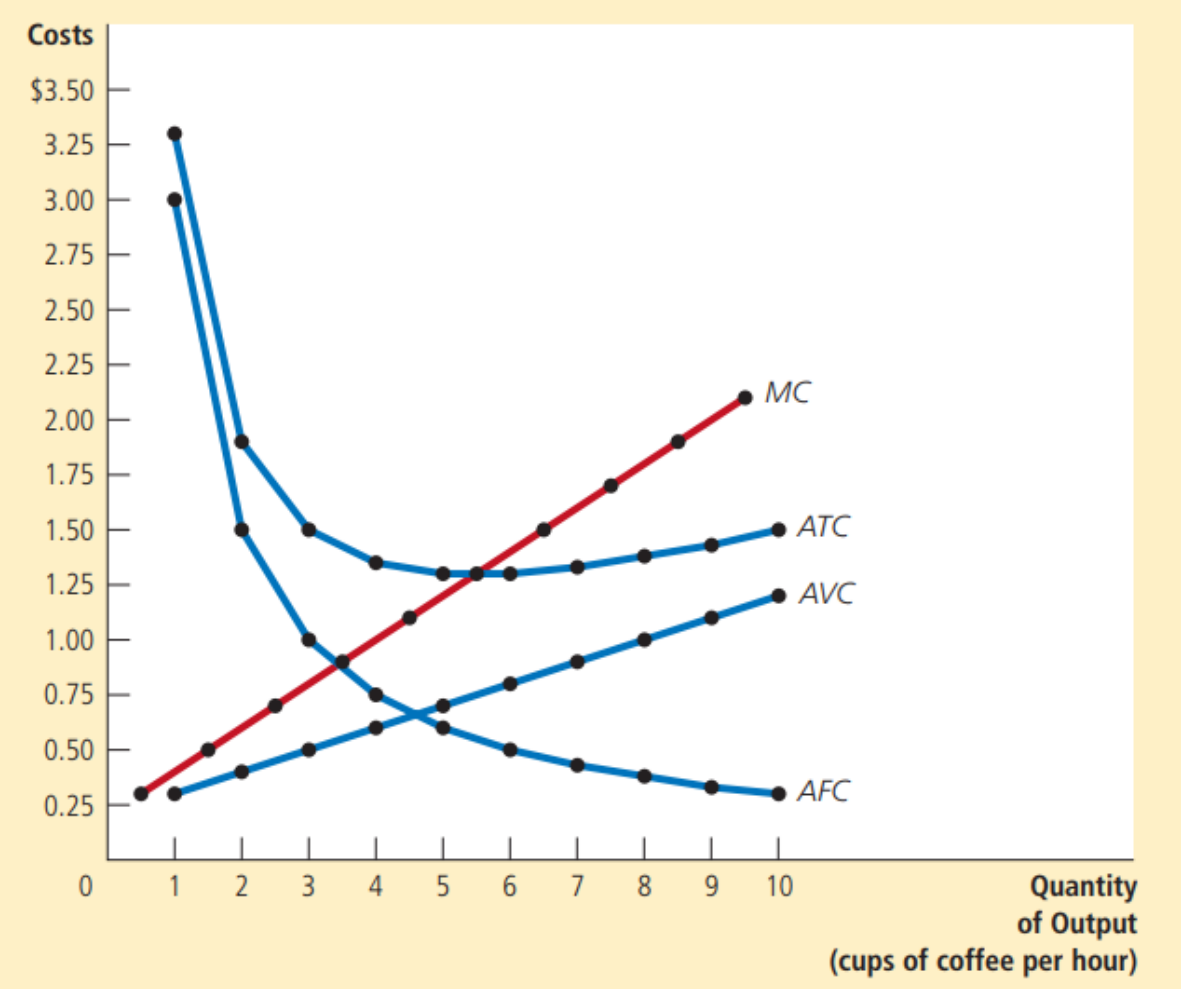
Average Costs

- Average total cost = TC / output
- Average fixed cost is always decreasing, while average variable costs may increase or decrease
- Marginal cost is the change in total cost from a "small" (1 unit) increase in output
- If marginal product is decreasing, what happens to marginal cost?

Marginal Costs

- If marginal product is decreasing, what happens to marginal cost?
  - Marginal cost is increasing: each additional unit of output is occuring using a larger amount of inputs than before
- If marginal costs are increasing, what happens to the average total cost?

U-shaped Average Total Costs



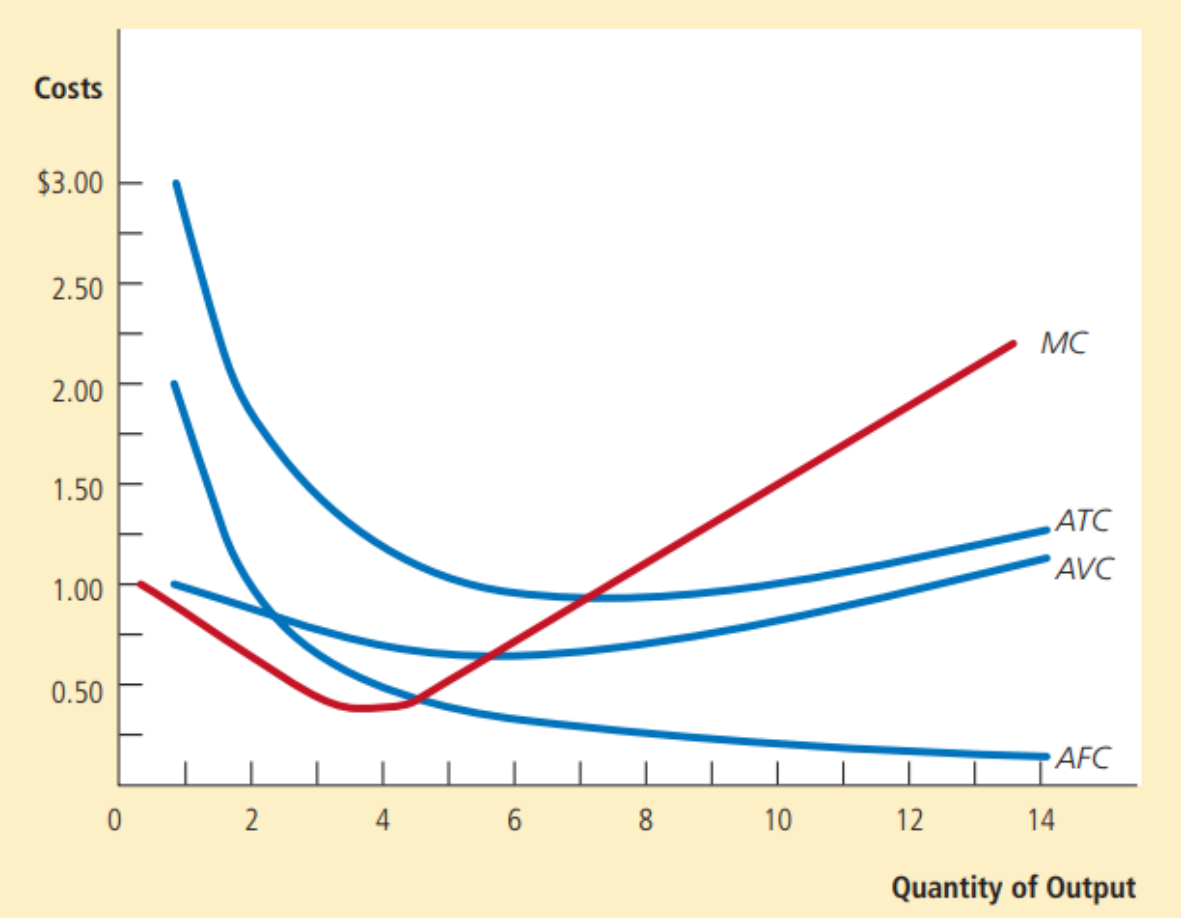
Marginal Costs

- If marginal costs are increasing, what happens to the average total cost?
  - ATC $\downarrow$ when ATC $>$ MC and $\uparrow$ once MC $>$ ATC
- This means the MC curve crosses the ATC curve at the *minimum* of ATC

Increasing Marginal Product

- Marginal product is *not* always decreasing
  - Particularly true early in production process
- This means that marginal cost is also *not* always increasing

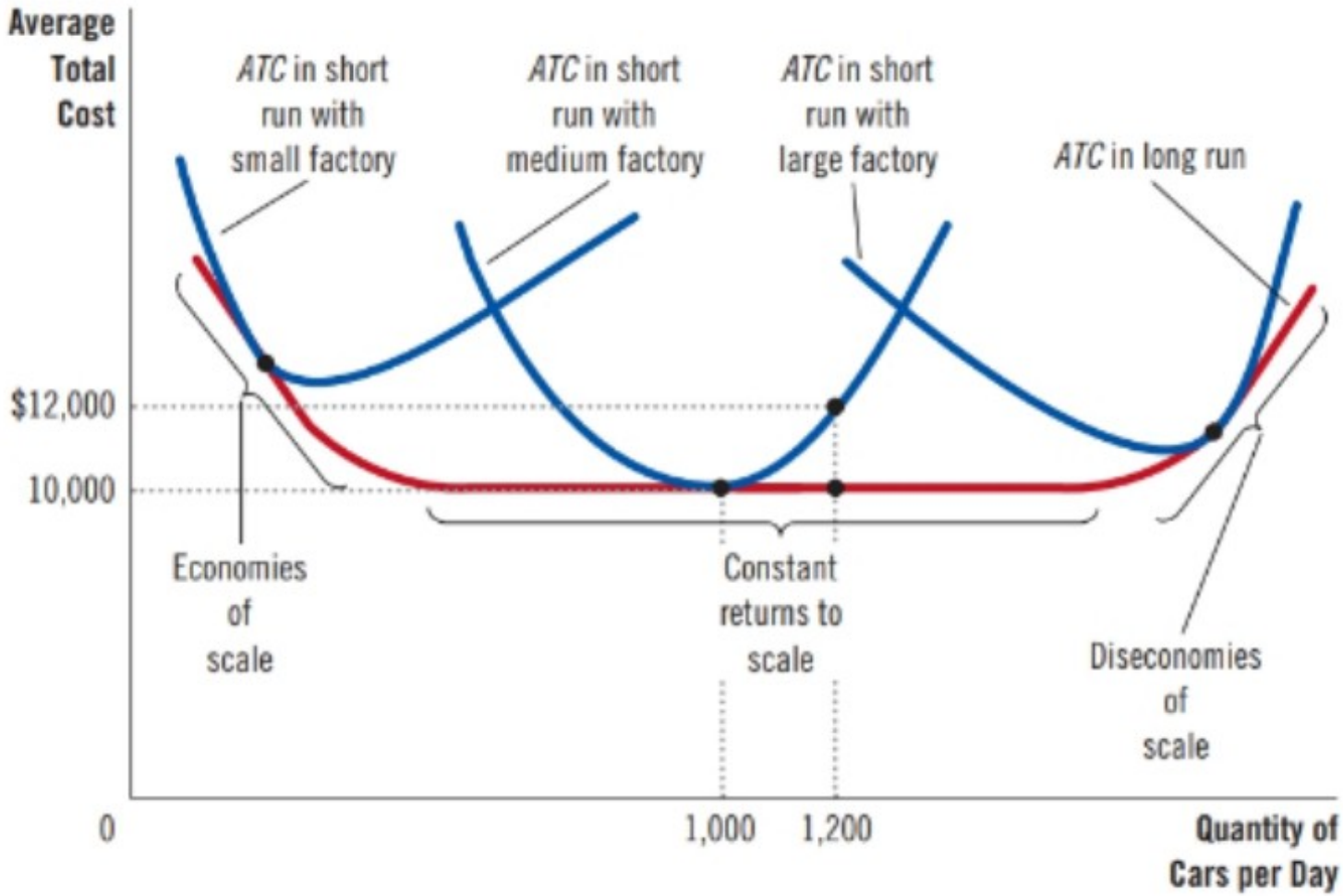
Decreasing MC



Short- vs. Long-run

- Costs may be different in the short and long run!
  - Economies of scale: long-run ATC decreases as output increases
  - Diseconomies of scale: long-run ATC increases as output increases
  - Constant returns scale: long-run ATC unchanged as output increases
- Why might we have economies of scale?

Short- vs. Long-run



Short- vs. Long-run

- Why might we have economies of scale?
  - Specialization
  - Organization
  - Coordinating costs

Summary

Term	Definition	Mathematical Description
Explicit costs	Costs that require an outlay of money by the firm	
Implicit costs	Costs that do not require an outlay of money by the firm	
Fixed costs	Costs that do not vary with the quantity of output produced	FC
Variable costs	Costs that vary with the quantity of output produced	VC
Total cost	The market value of all the inputs that a firm uses in production	$TC = FC + VC$
Average fixed cost	Fixed cost divided by the quantity of output	$AFC = FC/Q$
Average variable cost	Variable cost divided by the quantity of output	$AVC = VC/Q$
Average total cost	Total cost divided by the quantity of output	$ATC = TC/Q$
Marginal cost	The increase in total cost that arises from an extra unit of production	$MC = \Delta TC/\Delta Q$