

ECONOMICS 201 WEEK 4: PRODUCTION AND COST

THE BUSINESS FIRM

PRODUCTION

COSTS OF PRODUCTION

THE BUSINESS FIRM

- Types of firms classified by ownership:
 - Single Proprietorship
 - Partnership
 - Corporation
- Firms classified by size
 - Big Business
 - Small Business

THE BUSINESS FIRM

Goal of ALL firms:

Maximize Profit

- Profit = Total Revenues – Total Costs
- Total Revenues = Price X Quantity
- Total Costs = All Costs of Production

PRODUCTION

Production

- Combining **Inputs** to make goods and services

Technology

- Available methods for combining inputs to produce a good or service

PRODUCTION

Long run

- Planning stage.
- All inputs are variable.
- Variable input
 - Amount of input used **changes** as the level of output changes.

Short run

- Producing stage.
- At least 1 input is fixed.
- Fixed input
 - Amount used remains **constant** regardless of how much output is produced

PRODUCTION: Assumptions*

Firm uses 2 inputs: capital and labor

- Capital
 - Fixed in short-run
 - variable only in long-run
- Labor
 - Variable in short-run.
 - And variable in long-run
- *These are “simplifying” assumptions to make the analysis less complicated.

PRODUCTION IN THE SHORT RUN

Short-run

- Capital is fixed.
- Labor is variable.

Total product = Q

Q = maximum amount produced from a given amount of capital and labor.

Production Function: $Q = f(K,L)$

Note: K is the customary abbreviation for Capital. Possibly because “ C ” is used to refer to “Cost.”

PRODUCTION IN THE SHORT RUN

Marginal product of labor (MP_L)

- The additional **output** produced when one more worker is hired

$$MP_L = \Delta Q / \Delta L$$

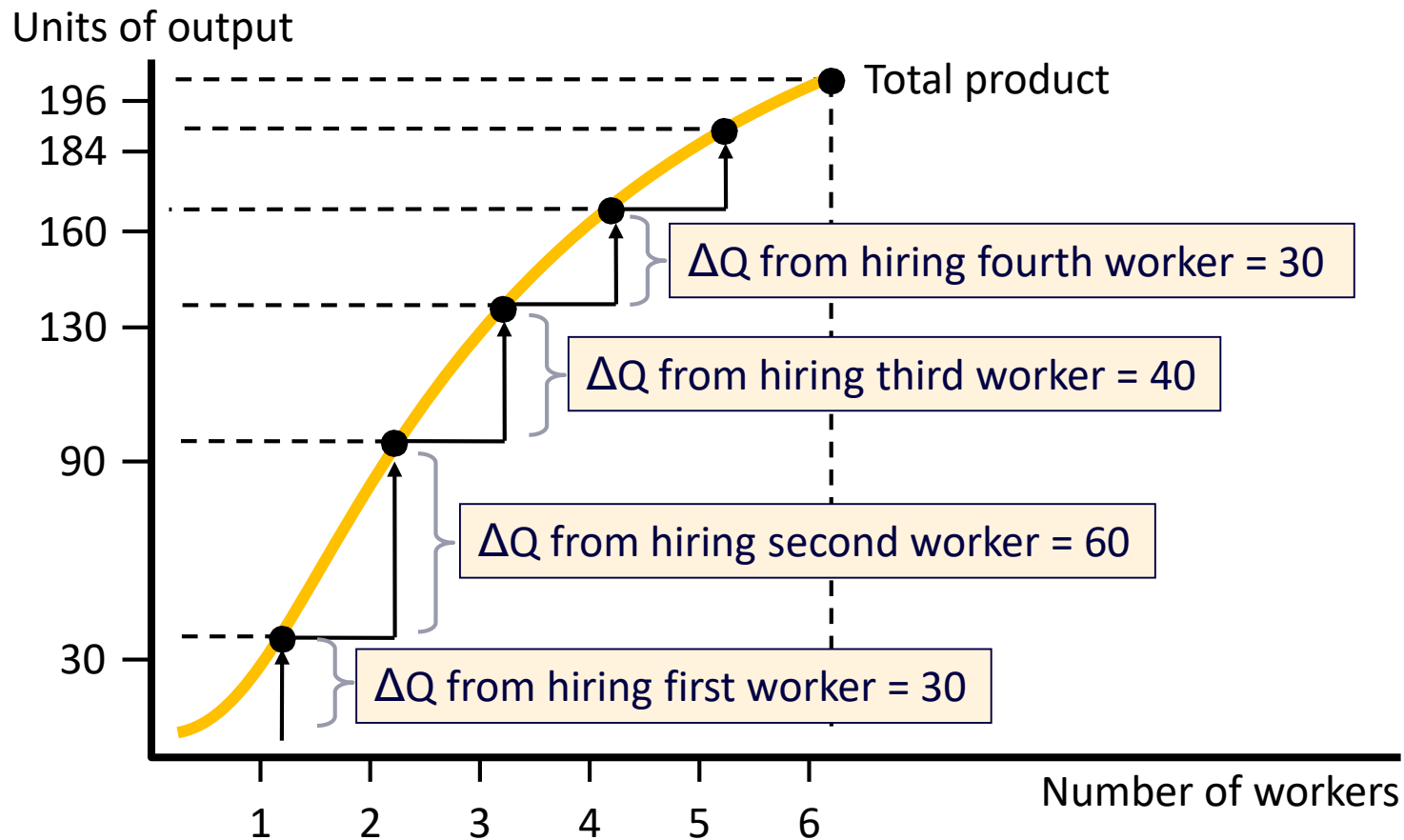
Note: ΔL = Change in labor = 1 more worker

TOTAL PRODUCT

(Output in the Short-run)

Labor Input	Total Product	Marginal Product
0	0	0
1	10	10
2	25	15
3	45	20
4	60	15
5	70	10
6	75	5
7	75	0
8	70	-5

TOTAL AND MARGINAL PRODUCT

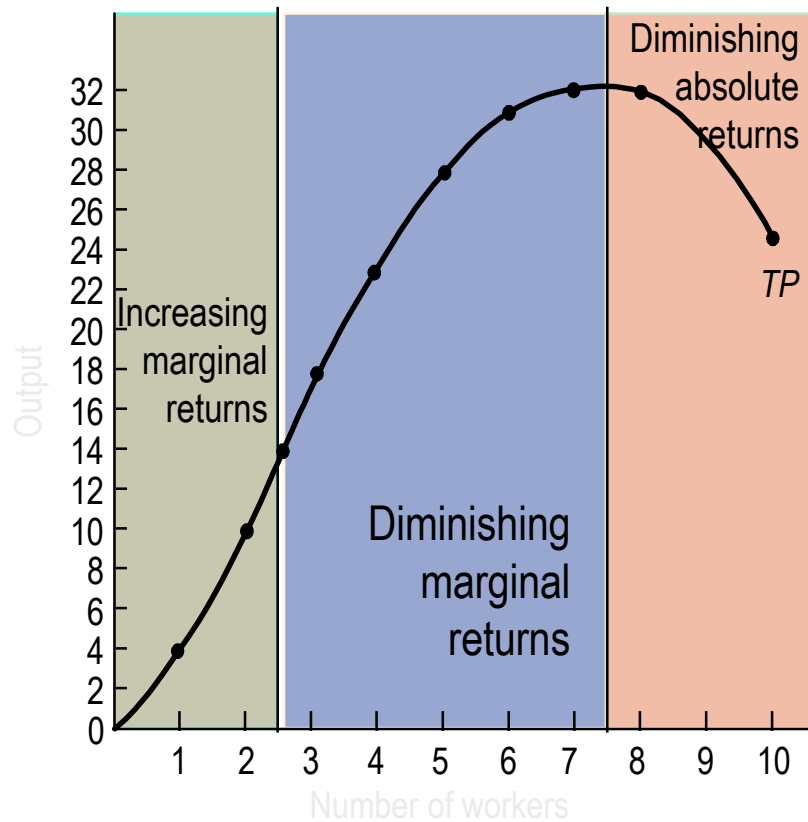


PRODUCTION IN THE SHORT RUN

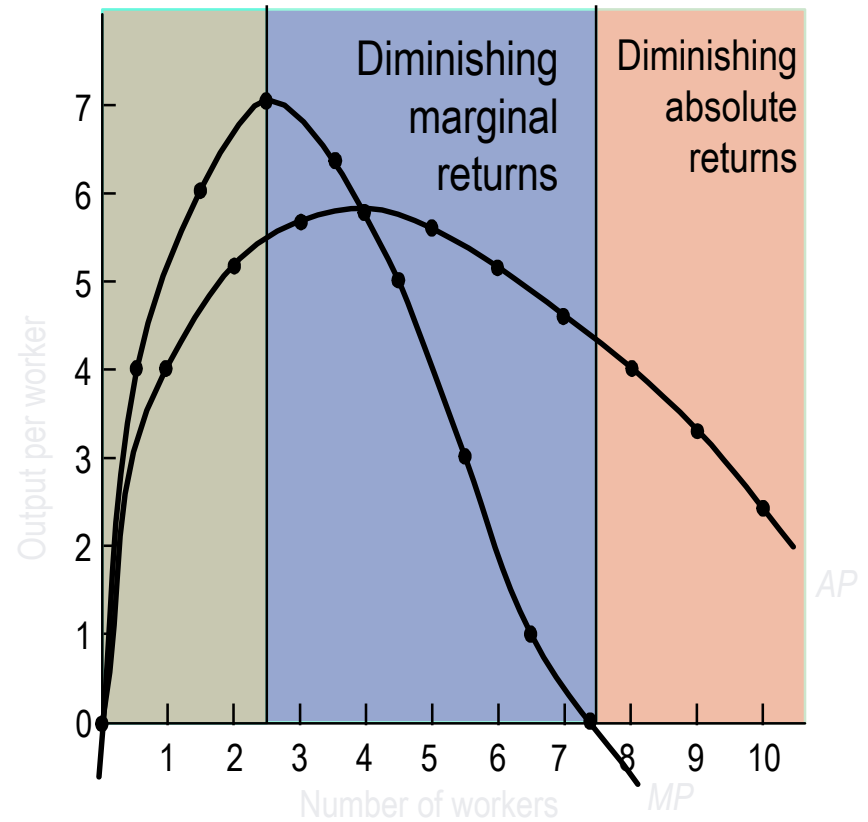
Law of diminishing marginal returns

- The marginal product of labor eventually decreases as more labor is used, while capital is held constant.
 - Reason: The productivity of a worker depends on the amount of capital (tools and equipment) he/she has to work with. If the number of workers increases and the amount of tools and equipment remain the same, then each additional worker will have fewer and fewer tools to work with.

THE LAW OF DIMINISHING MARGINAL PRODUCTIVITY



Total product



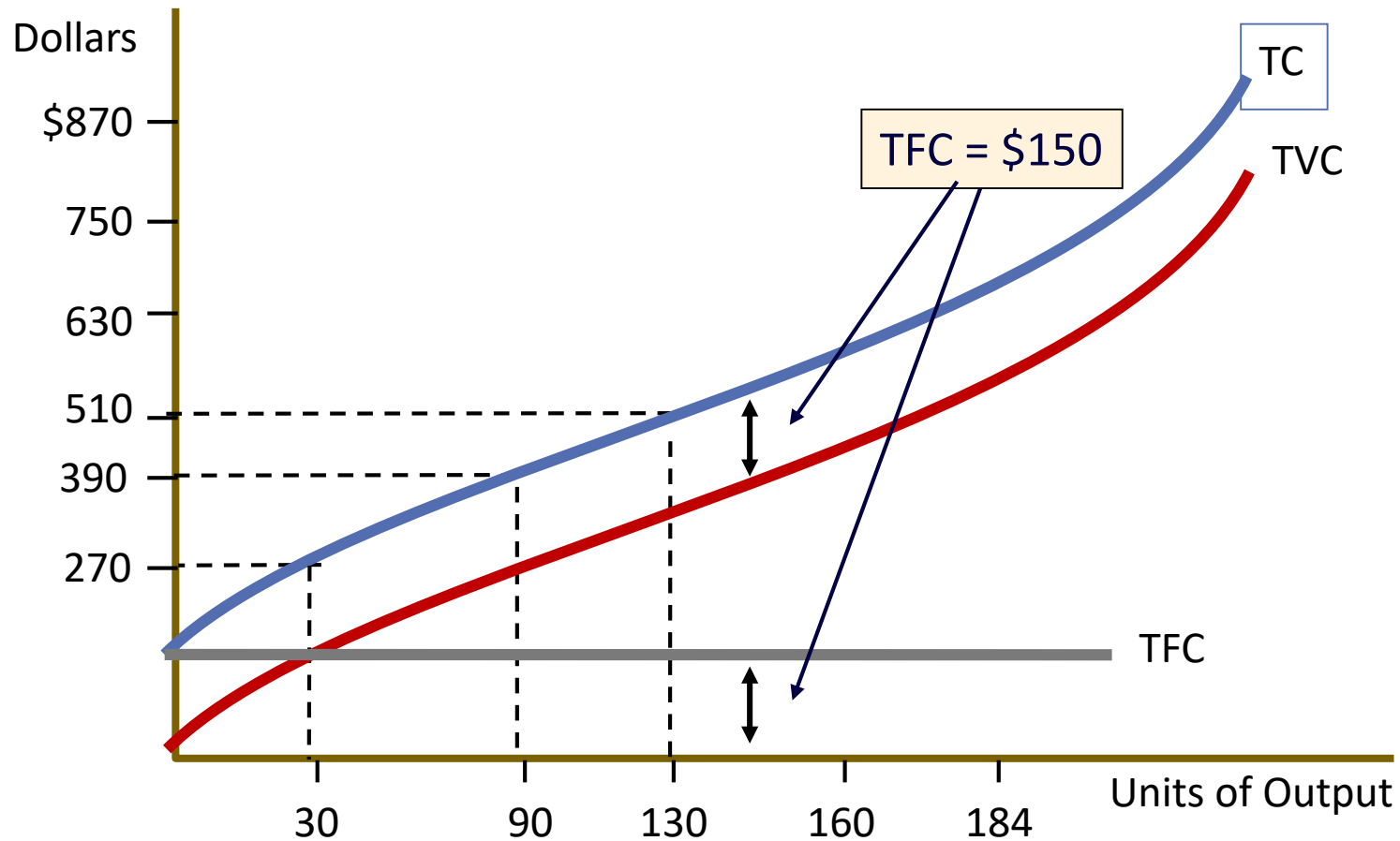
(Marginal and average product)

PRODUCTION COSTS

Short Run

- Fixed costs
 - Costs of fixed inputs
 - Remain constant as output changes
- Variable costs
 - Costs of variable inputs
 - Change with output
- Total Costs = Total Fixed costs + Total Variable Costs

THE FIRMS TOTAL COST CURVES



AVERAGE COSTS

Costs per unit

- Average fixed cost ($AFC = TFC / Q$)
- Average variable cost ($AVC = TVC / Q$)
- Average total cost ($ATC = TC / Q$)

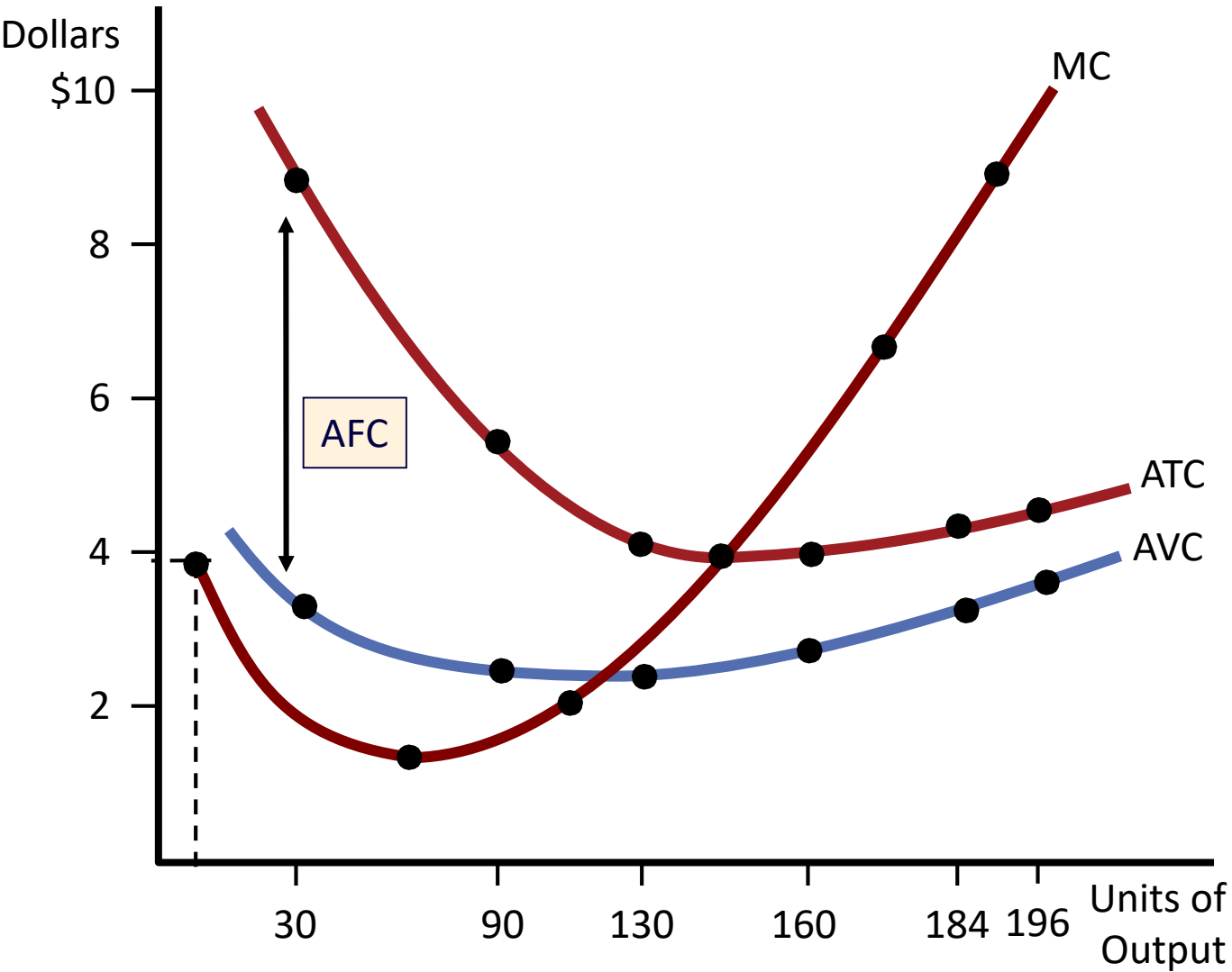
COST IN THE SHORT RUN

Marginal cost (MC)

- Additional cost of producing one more unit of output

$$MC = \Delta TC / \Delta Q$$

AVERAGE AND MARGINAL COSTS



LONG-RUN PRODUCTION DECISIONS

Goal is the lowest cost of production given:

- Costs of various inputs
- Technologies available
- Long-run decisions are in the “planning stage.”
- Once a technology has been selected, buildings leased or purchased, factories built, machinery and tools purchased, etc., then capital becomes **fixed**.
 - *All actual production takes place in the short-run.*

LONG-RUN PRODUCTION DECISIONS

Efficiency

- Technical efficiency –
 - The method that produces a given level of output with as few inputs as possible.
- Economic efficiency –
 - the method that produces a given level of output at the lowest possible cost.

LONG-RUN PRODUCTION DECISIONS

In the short run

- A firm can only move along its current ATC curve.
 - i.e. the firm cannot switch to a cheaper method of production in the short-run. Firm is already committed to 1 particular type of technology and capital.

In the long run

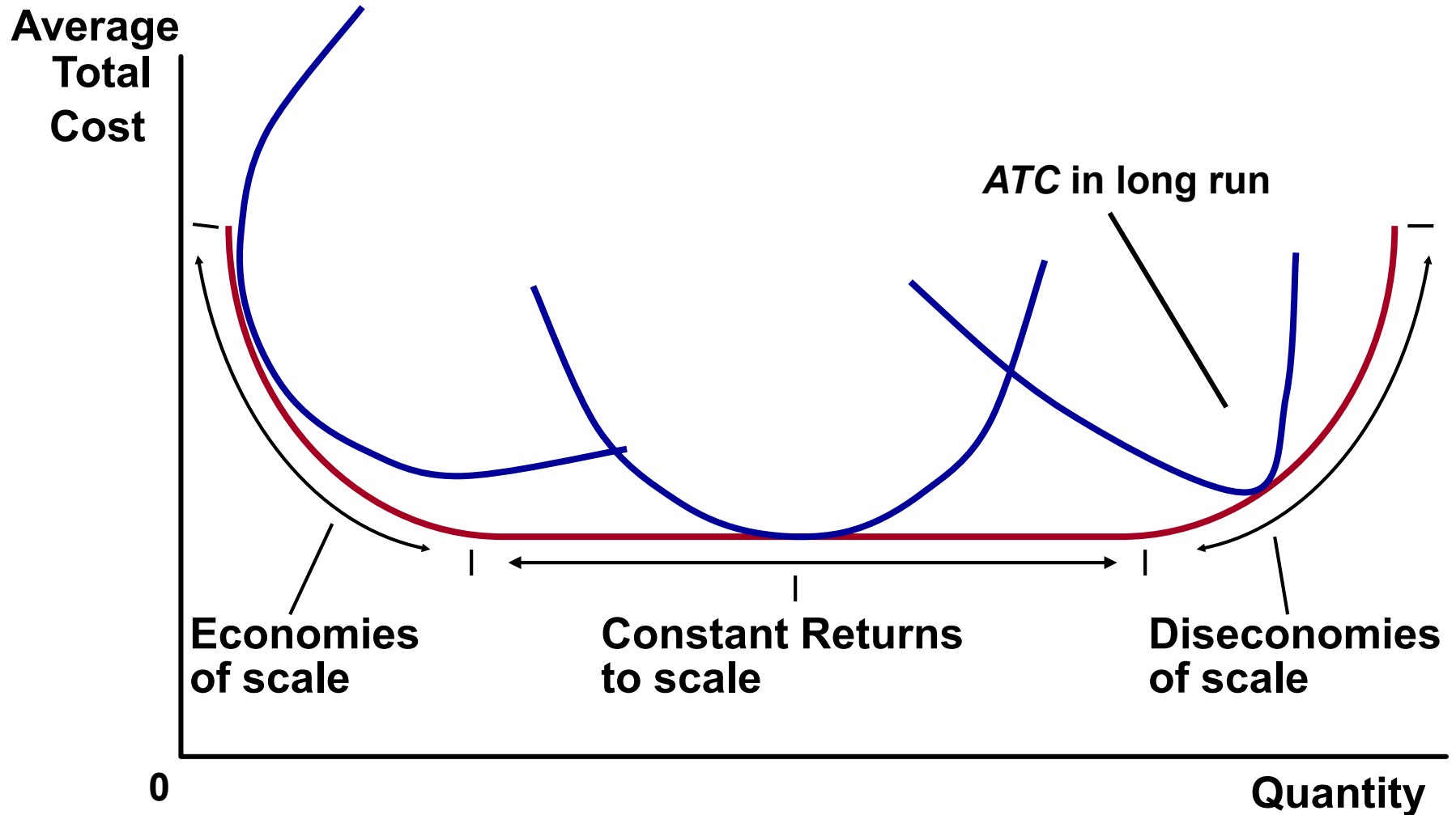
- A firm can move from one ATC curve to another.
 - i.e., the firm can switch to a cheaper method of production in the long-run.

ECONOMIES OF SCALE

In the longer run all inputs are variable.

- Only economies of scale influence the shape of the long-run cost curve.
 - Economies of scale – long run average total costs **decrease** as output **increases**.
 - Diseconomies of scale – long run average total costs **increase** as output **increases**.
 - Constant returns to scale -- long-run average total costs *do not vary* as output increases.

ECONOMIES OF SCALE



THE GOAL OF PROFIT MAXIMIZATION

The firm

- A single economic decision maker
- Goal: to maximize its owners' profit
- Decisions
 - What price to charge
 - How much to produce

UNDERSTANDING PROFIT

Accounting profit

- Total revenue minus accounting costs

Economic profit

- Total revenue minus all costs of production, explicit and implicit
- Recognizes all the opportunity costs of production

UNDERSTANDING PROFIT

Total Revenue from Selling T-shirts		\$300,000
Cost of raw materials	\$ 80,000	
Wages and salaries	150,000	
Electricity and phone	20,000	
Advertising cost	40,000	
Total Explicit Cost		290,000
Accounting Profit		\$ 10,000

UNDERSTANDING PROFIT

Total Revenue from Selling T-shirts \$300,000

Cost of raw materials	\$ 80,000
Wages and salaries	150,000
Electricity and phone	20,000
Advertising cost	40,000

Total Explicit Costs **\$290,000**

Investment income foregone	\$ 6,000
Rent foregone	4,000
Salary foregone	40,000

Total Implicit Costs **\$ 50,000**

Total Costs **\$340,000**

Economic Profit **−\$ 40,000**

NEXT TOPIC: PROFIT MAXIMIZATION

Depends on Market Structure:

Week 5: Perfect Competition & Monopoly

Week 6: Monopolistic Competition & Oligopoly



NEXT TOPICS:

Market Structures:

Perfect Competition

Imperfe

APPENDIX

Summary of Cost curves

THIS SECTION IS FOR REFERENCE.

There are 7 types of costs and cost curves. This can get confusing. So I have provided this section as a reference to be used in studying for exams or working problems.

TOTAL COST CURVES

Total Cost (TC)

- Total Cost curve **rises** with output.
- Shape reflects diminishing marginal returns—curve gets steeper...

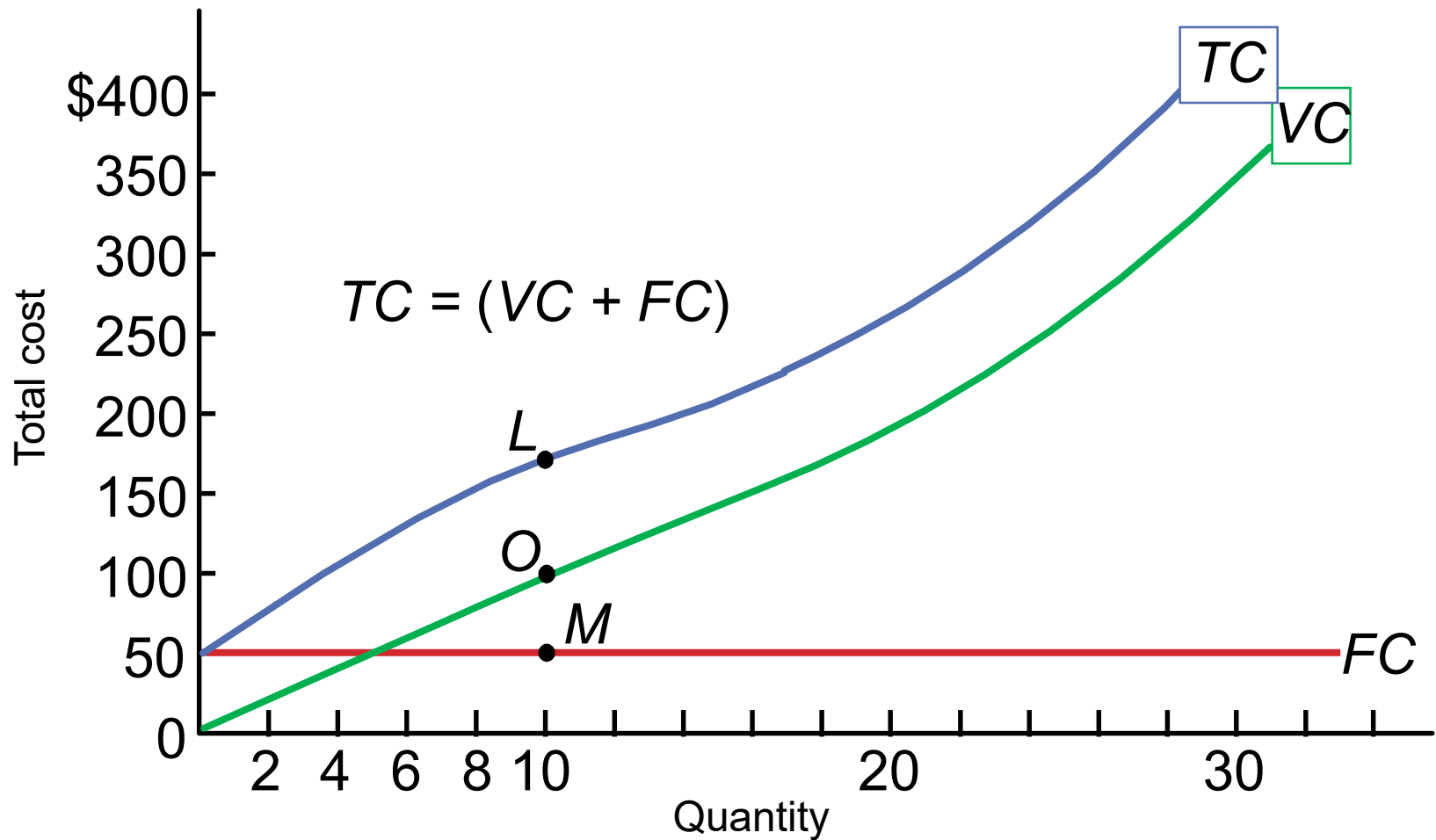
The total variable cost (VC)

- Variable Cost curve has the same shape as the total cost curve.

Total Fixed Cost (FC)

- Fixed Cost does not vary with output.

TOTAL COST CURVES

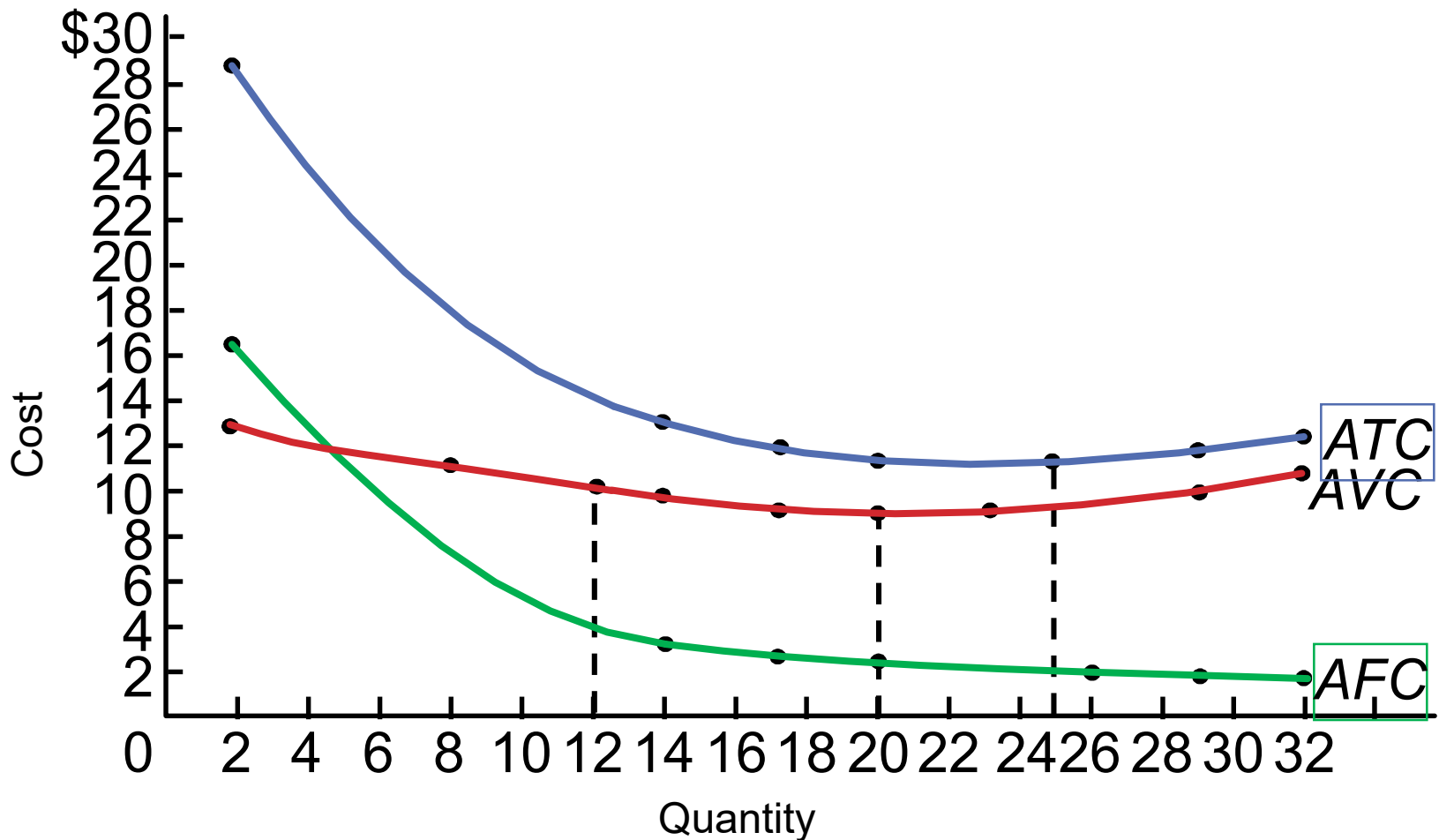


AVERAGE COST CURVES

Average Cost curves measure **per unit costs**.

- Average Total Cost (ATC) and Average Variable Cost (AVC) are **U shaped**.
- The Average Fixed Cost (AFC) declines as output rises.

AVERAGE OR PER UNIT OUTPUT COST CURVES

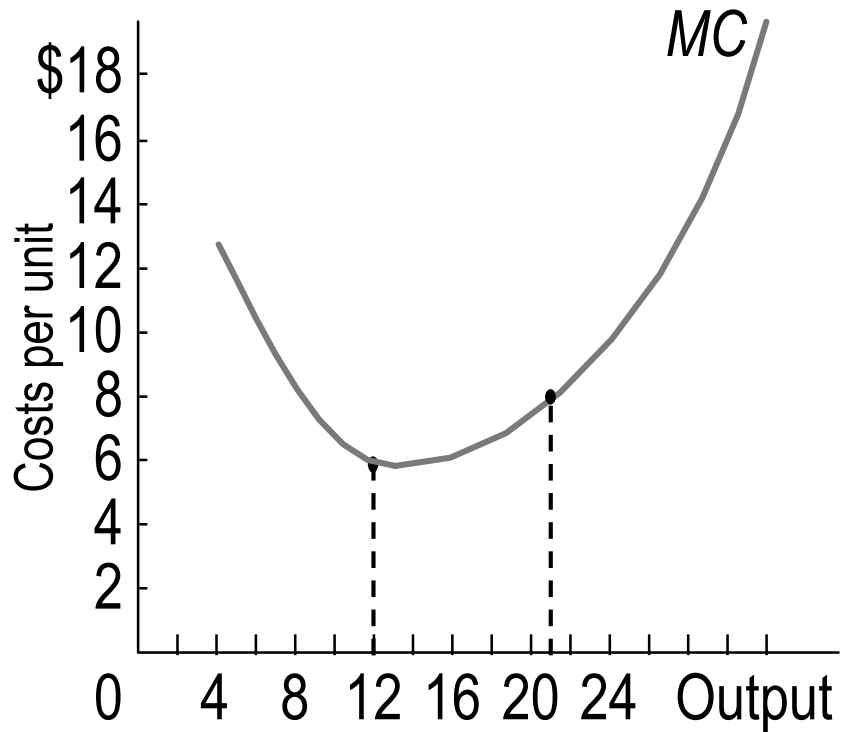


MARGINAL COST

Marginal cost rises with the amount of output produced.

- This reflects the property of *diminishing marginal product*.

MARGINAL COST



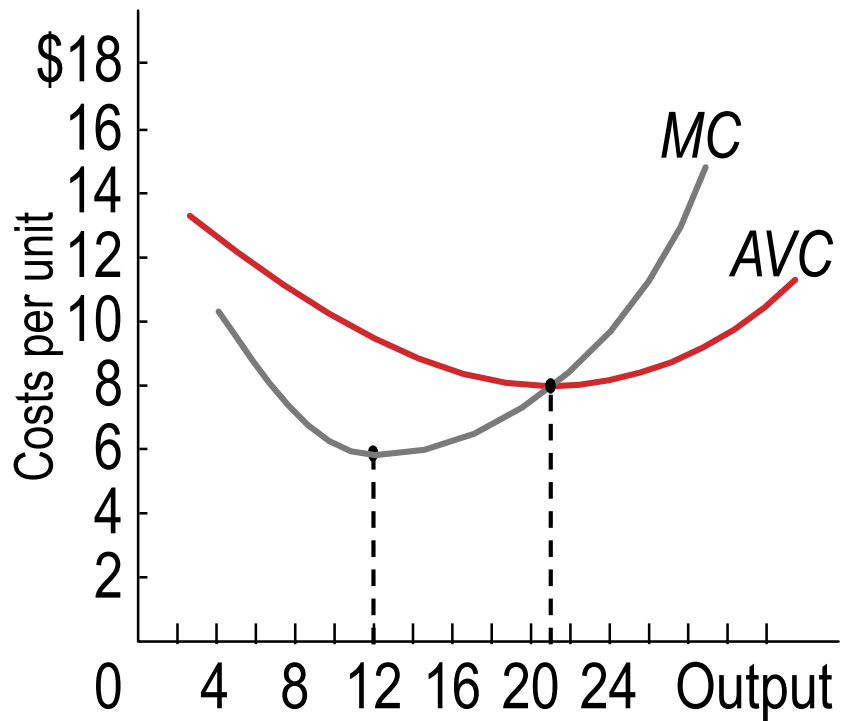
The marginal cost curve has the shape of a Nike symbol (sort of).

COST CURVES AND THEIR SHAPES

Relationship Between Marginal Cost and Average Total Cost

- The marginal-cost curve crosses the average variable cost curve (and average total cost curve) at the **lowest point**.

MARGINAL COST AND AVERAGE COST



THE RELATIONSHIP BETWEEN PRODUCTIVITY AND COSTS

