

Production and Cost Curves

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Firms

A *firm* is an economic institution that transforms inputs, or factors of production, into outputs, or products for consumers.

- **Must determine a *market need***
- **Must decide *HOW to produce the good or service***

Types of Firms

Sole Proprietorships

- One owner
- Easy to start
- Limited access to financial capital
- Owner's personal assets are subject to **unlimited liability**

Types of Firms

Partnerships

- **More than one owner**
- **Can divide tasks amongst partners – division of labor**
- **Unlimited liability of all owners – for each partner's actions**

Types of Firms

Corporations

- **Owners are called “stockholders”**
- **Corporation has legal rights (like an individual)**
- **Can raise money by issuing stock**
- **Limited liability for all owners – losses are limited to value of stock**

Profit

Profit: the difference between total revenue and total cost.

Revenue: price per unit times quantity sold.

We assume that the goal of the firm is to maximize profit.



Economic Costs

- **Economic costs include both *explicit* and *implicit* costs.**
 - ***Explicit costs*: those expenses paid directly to some other economic entity.**
 - ***Implicit costs*: all opportunity costs of using resources that belong to the firm.**
 - **These include depreciation, depletion of business assets, and the opportunity cost of a firm's capital.**

Economic Costs

Sunk costs: costs that have already been incurred and cannot be recovered.

- ***Examples: money spent on existing technology that has become obsolete, past advertising that has run in the media.***
- ***Rational decisions about future profits will **ignore** sunk costs.***

Economic and Normal Profits

- Economists define a **normal rate of return** on capital as the return **just sufficient to keep investors satisfied.**
- The **normal rate of return** therefore represents the **opportunity cost of capital.**
- If a firm's rate of return on capital falls below this rate, investors will put their funds to use elsewhere.

Economic and Normal Profits

- We include ***both explicit and implicit costs*** in our analysis.
- We say a firm is earning ***economic profits*** if it is generating profits in excess of zero once implicit costs are factored in.
- A ***normal profit*** is the rate of return necessary to keep a firm in business over an extended period of time.

Examples of Explicit and Implicit Costs

Explicit

- Salaries
- Lease payments
- Cost of goods sold
- Utilities
- Insurance
- Office supplies

Implicit

- Earnings that an owner could have made in an alternative job
- Interest on capital invested in business that could have been made by putting the capital in a bank account

Short Run versus Long Run

- **The *short run* is a period of time over which at least one factor of production is fixed, or cannot be changed.**
 - **For the sake of simplicity, economists typically assume that **plant capacity is fixed in the short run.****
- **The *long run* is a period of time sufficient for a firm to adjust all factors of production, including plant capacity.**
 - **Firms can enter or exit the industry in the long run.**

Production in the Short Run

***Production* is the process of turning inputs into outputs.**

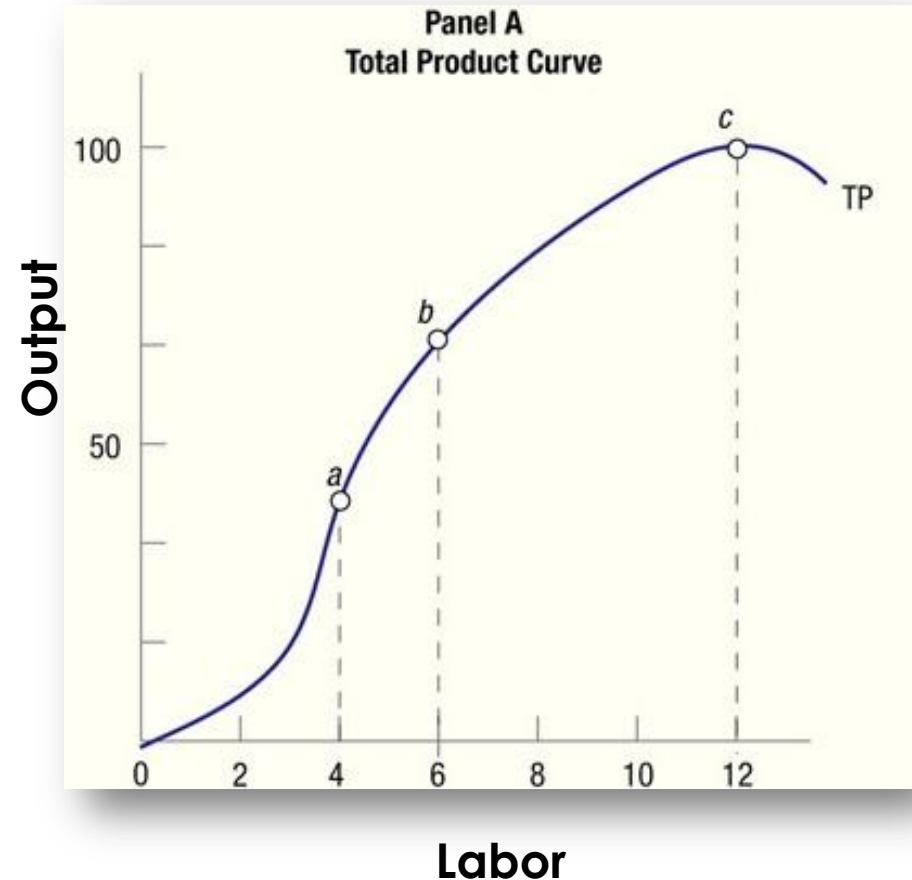
- **The cost structure of a firm depends on the nature of the production process.**
- **Average product** is total output divided by the amount of labor input (Q/L).
- ***Marginal product initially rises as more workers are hired; then declines.***

Ponder this:

- Does profit-maximization necessarily mean cost-minimization?
- Can you think of a firm which **maximizes profits** but does not appear to **minimize costs**? (hint: think of monopolies and other large firms)
- (We'll get to the details of profit maximization in later chapters.)

Production in the Short Run

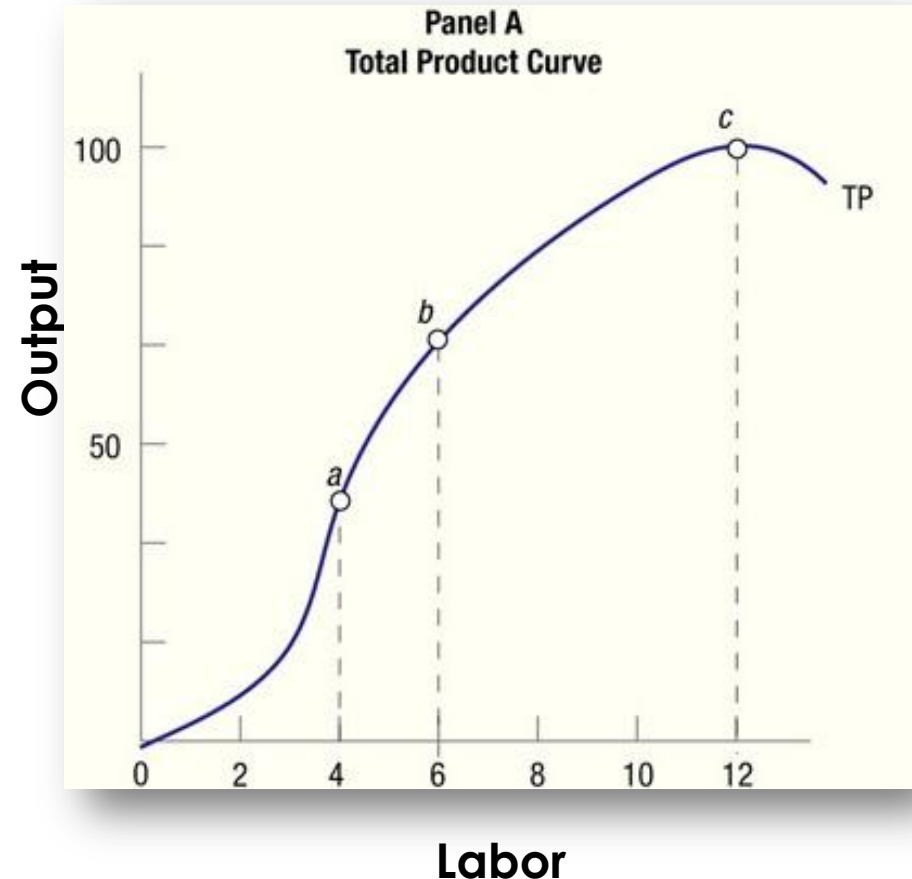
- **Increasing marginal returns**
 - That section of the total product curve in which *each worker adds to output by more than the previous worker*
 - From 0 to 4 workers this holds true



Production in the Short Run

- **Diminishing marginal returns**

- That section of the total product curve in which *each worker adds to output by an increment smaller than what was added by the previous worker*
- From 4 to 12 workers this holds true



Costs of Production

- **Short run costs are either fixed or variable.**
 - *Fixed costs* do not vary with the quantity produced.
 - *Variable costs* fluctuate as the level of output changes.
- **Total cost is the sum of fixed and variable costs.**

Average Costs

- If **TFC = total fixed cost**, **TVC = total variable cost**, and **TC = total cost**,
- **Average fixed cost = TFC/Q**
- **Average variable cost = TVC/Q** .
- **Average total cost = TC/Q** .

Example: if fixed cost is 100, fill in the following table.

Q	TVC	TC	AFC	AVC	ATC
0	20				
1	30				
2	46				
3	80				

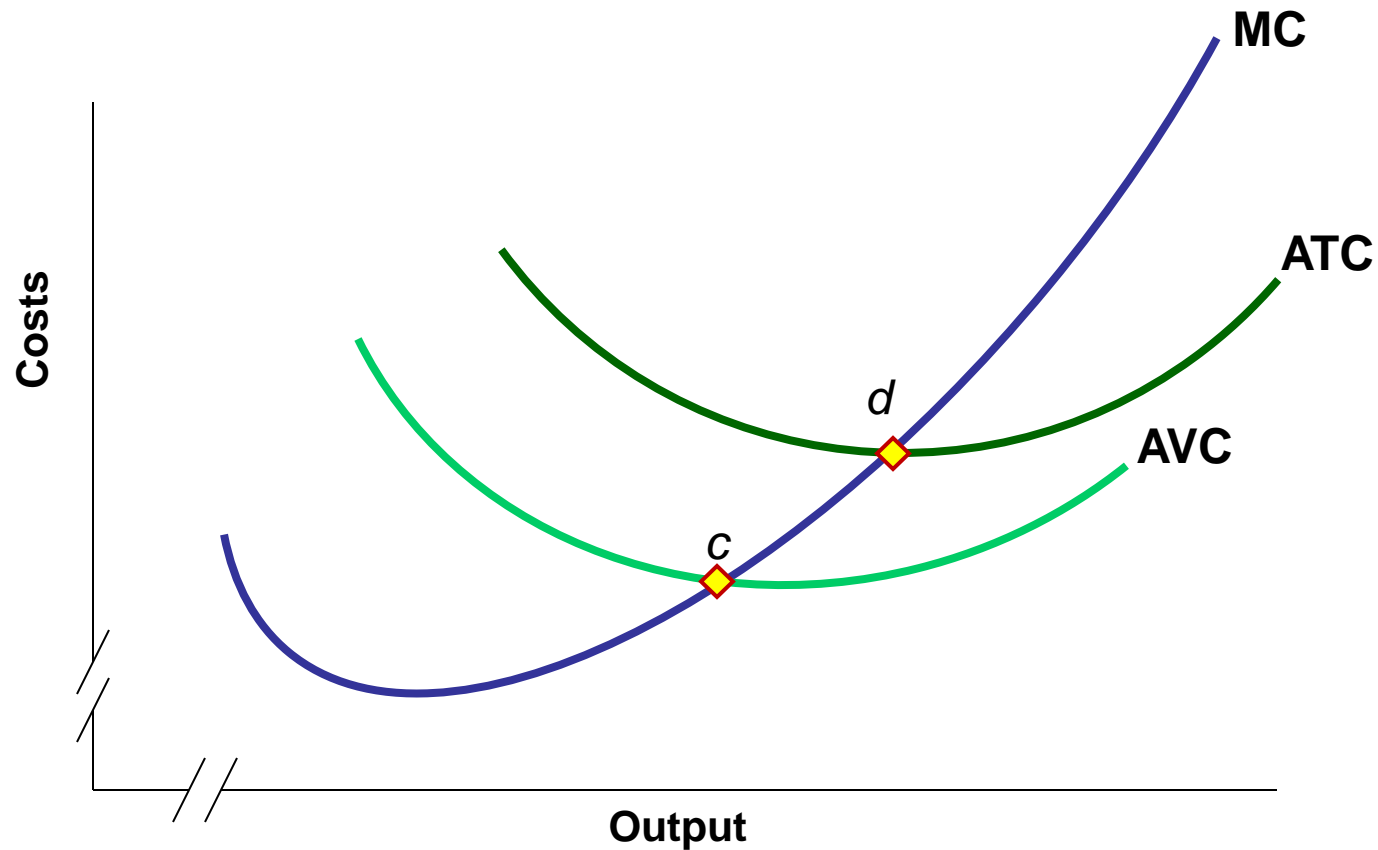
Marginal Cost

- **Because of increasing and decreasing returns associated with typical production processes, average costs will vary with the level of output.**
- ***Marginal cost* is the change in total cost arising from the production of additional units of output.**
 - **$\Delta TC/\Delta Q$**

Short Run Cost Curves

- **Both the AVC and ATC curves are U-shaped.**
 - At relatively low levels of output, the curves slope downward, reflecting an **increase in returns as average costs drop.**
 - As production levels rise, **diminishing returns set in**, and average costs start to rise again.
 - *You can find total costs, total fixed costs, and total variable costs for any level of output by multiplying the average cost at that point by the quantity of output produced.*

Average and Marginal Costs

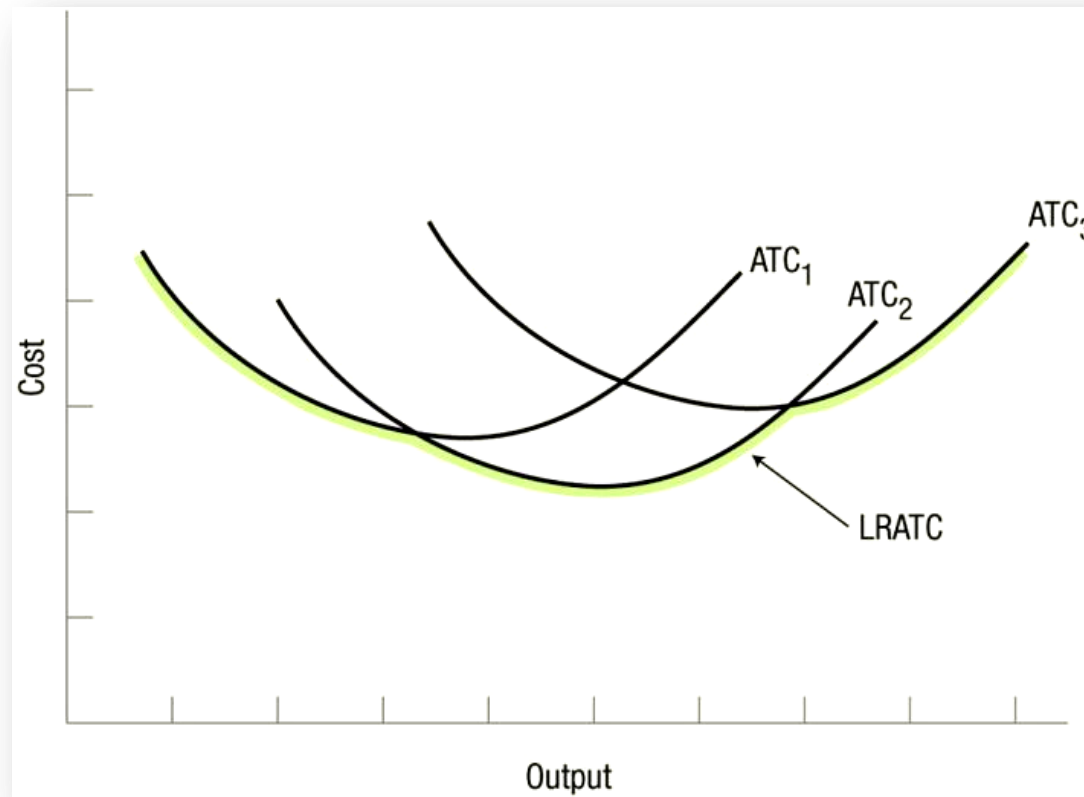


Note that the marginal cost curve passes through the minimum points of the ATC and AVC curves.

Long Run Costs

- **In the long run, a firm will choose the plant size appropriate for its market.**
- **Each different plant size is associated with a unique long run cost structure.**

The Shape of the LRATC



The concept of LRATC assumes that, in the long run, firms will build plants of the size best fitting the levels of output they wish to produce.

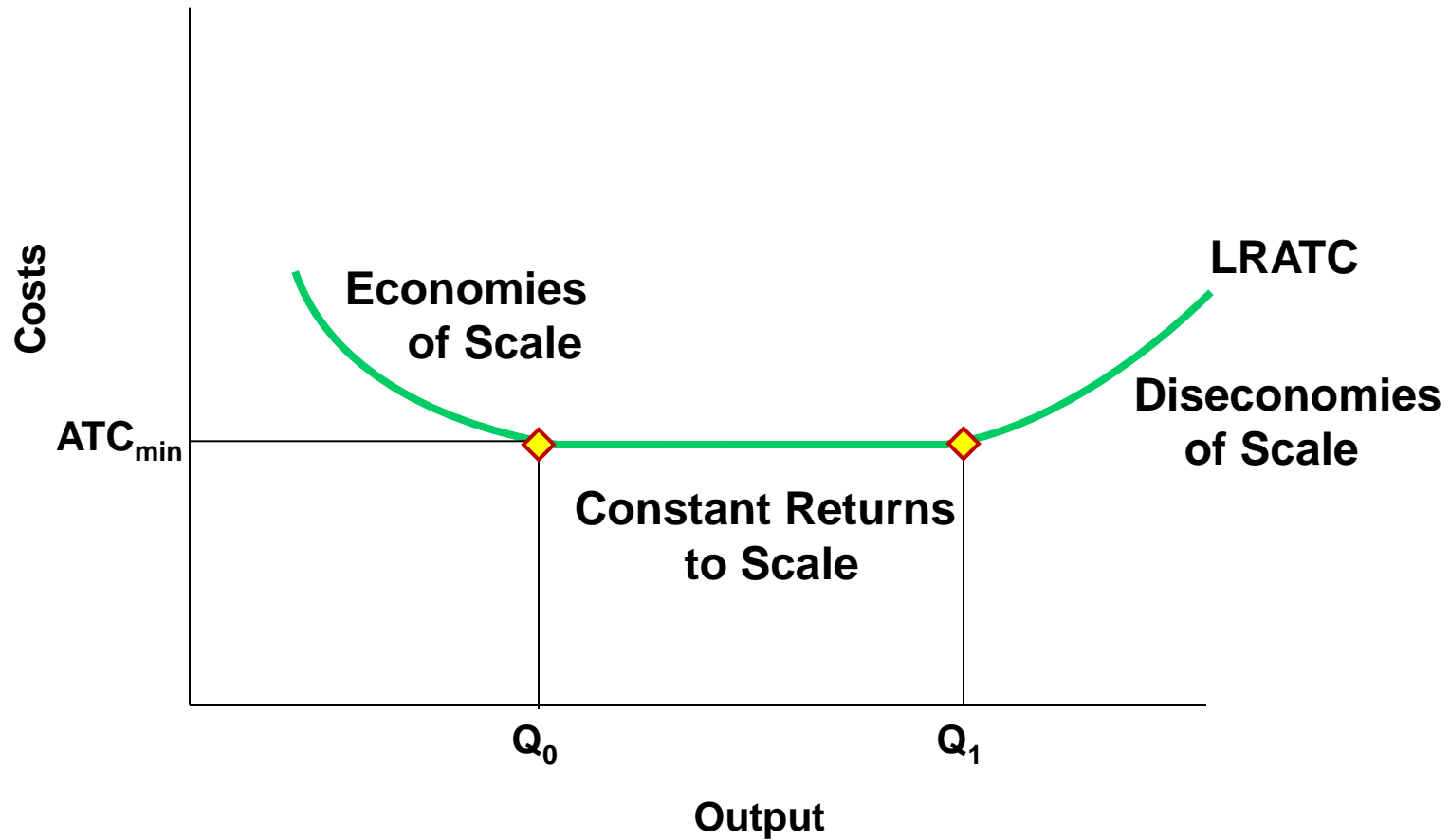
Economies of Scale

- ***Economies of scale: As a firm's output increases, its long run average total costs will tend to decrease.***
- **This is because, as the firm grows in size, **economies of scale** result from such items as:**
 - ***specialization of labor and management***
 - ***better use of capital***
 - ***increased possibilities for making several products that utilize complementary production techniques***

Diseconomies of Scale

- **As firms continue to grow, they eventually encounter **diseconomies of scale**.**
- ***Diseconomies of scale: a range of output where average total costs tend to increase.***
 - ***Some firms become so big that management loses the flexibility to adapt quickly.***
 - ***In the 1980s, IBM fell into this trap—slow to react to changing market conditions for mainframe, mini, and microcomputers, the company was left behind by smaller competitors.***

Returns to Scale



Economies of Scope

Economies of Scope: by producing products that are interdependent, firms are able to produce and market these goods at lower costs.

- ***Once a company has established a department, it's easier in the future to expand.***
- ***“Learning by doing.”***

Role of Technology

Technology plays in altering the shape of the LRATC curve.

- **Enhanced production techniques**
- **Instantaneous global communication**
- **The use of computers in accounting and cost control**

are just a few recent examples of ways in which technology has permitted firms to increase their scale of operations.