



Understanding Economics

2nd edition

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Chapter 4 **Costs of Production**

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Chapter Focus

- In this chapter you will:
 - consider the major organizational forms of business—sole proprietorships, partnerships, and corporations
 - learn about economic costs (explicit and implicit) of production and economic profit
 - analyze short-run (total, average, and marginal) products, and the law of diminishing marginal returns
 - derive short-run (total, average, and marginal) costs
 - examine long-run results of production (increasing returns to scale, constant to scale, and decreasing to scale) and long-run costs

Types of Production

- There are three main sectors in the economy
 - the primary sector consists of industries that extract or cultivate natural resources
 - the secondary sector consists of industries that fabricate or process goods
 - the service sector consists of trade and information industries

Productive Efficiency

- Businesses choose from different production processes
 - a labour-intensive process employs more labour and less capital
 - a capital-intensive process employs more capital and less labour
- The lowest-cost process provides productive efficiency

Economic Costs

- Economic costs include
 - explicit costs which are payments to resource suppliers outside a business
 - implicit costs which are what owners give up by being involved in a business
- Economic profit is found by subtracting economic costs (both explicit and implicit) from total revenue

Production in the Short Run (a)

- In the short run
 - some inputs (such as capital) are fixed
 - other inputs (such as labour) are variable
- Inputs are combined to make a business's total product
 - average product is total product divided by the number of workers
 - marginal product is the extra total product with an additional worker

The Law of Diminishing Marginal Returns

- Short-run production is determined by the law of diminishing marginal returns
 - the addition of more variable input causes marginal product to fall after some point
 - average product also falls after some point

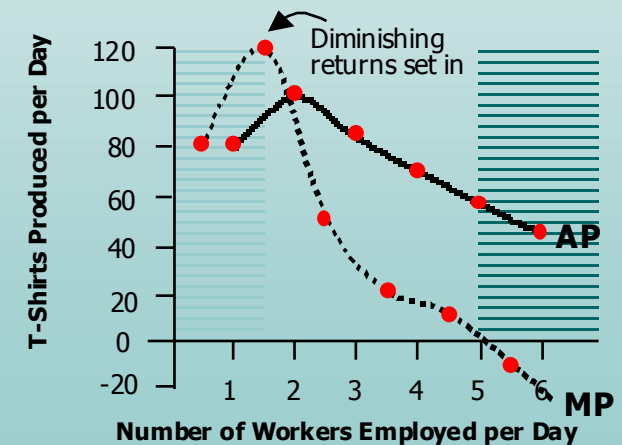
Relating Average and Marginal Values

- Average and marginal values are related using three rules
 - if an average value rises then the marginal value must be above the average value
 - if an average value falls then the marginal value must be below the average value
 - if an average value stays constant then the marginal value must equal the average value

Total, Marginal, and Average Products

Figure 4.4, Page 97

Labour (L) (workers per day)	Total Product (q) (T-shirts per day)	Marginal Product ($\Delta q/\Delta L$) (T-shirts per day)	Average Product (q/L) (T-shirts per day)
0	0	--	--
1	80	80	80
2	200	120	100
3	250	50	83.3
4	270	20	67.5
5	280	10	56
6	270	-10	45



Costs in the Short Run

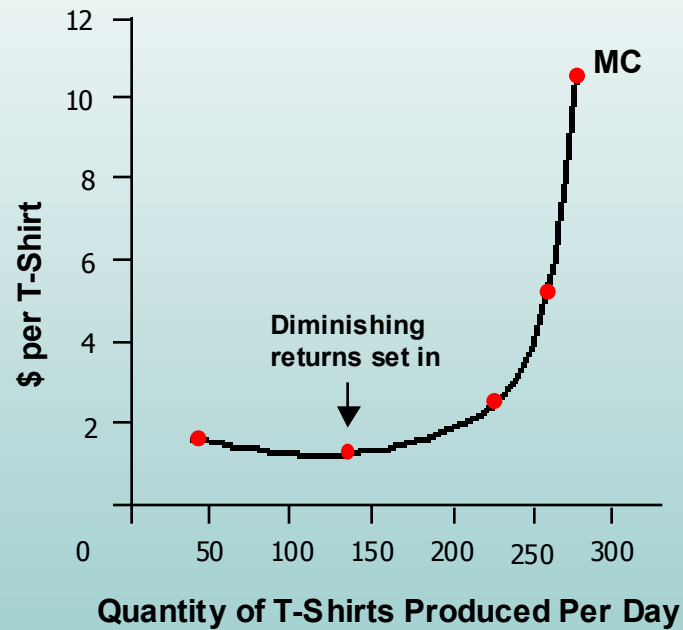
- Short-run costs include
 - fixed costs (costs of all fixed inputs)
 - variable costs (costs of all variable inputs)
 - total cost (fixed costs + variable costs)

Marginal Cost (a)

- Marginal cost is the extra cost of producing an extra unit of output
 - it equals the change in total cost divided by the change in total product
- The marginal cost curve is shaped like a “J” because of the law of diminishing marginal returns

Marginal Cost (b)

Figure 4.7, Page 100



Per-Unit Costs

- Per-unit costs include
 - average fixed cost (fixed costs divided by total product)
 - average variable cost (variable costs divided by total product)
 - average cost
 - either total cost divided by total product
 - or average fixed cost + average variable cost

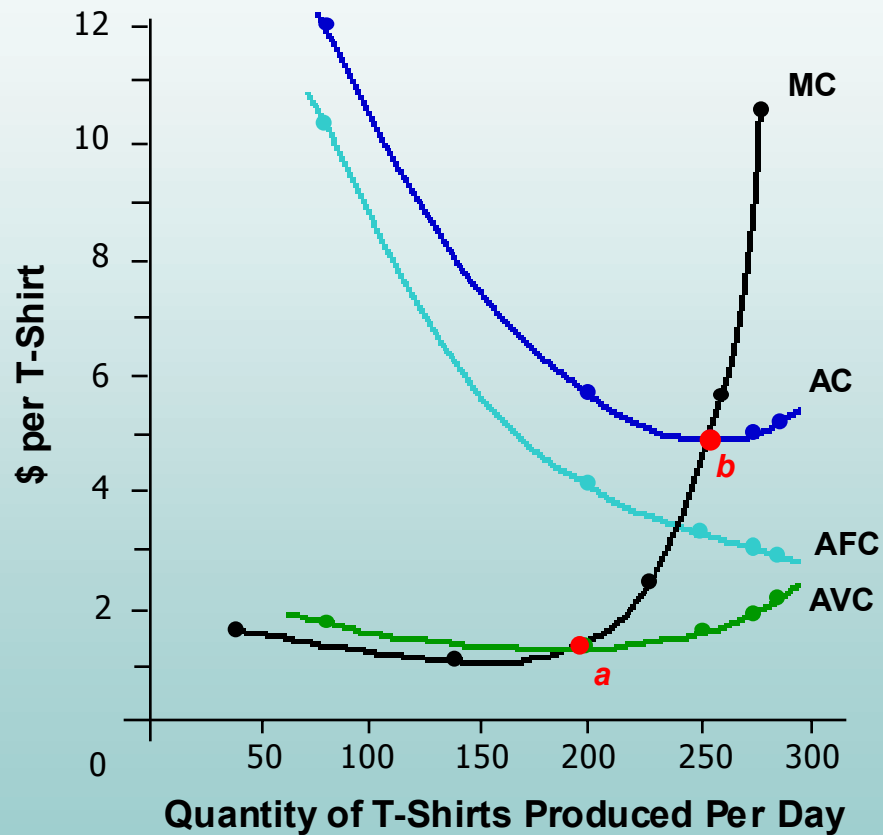
Short-Run Costs for Pure 'n' Simple T-Shirts

Figure 4.6, Page 99

Labour (L)	Total Product (q)		Fixed Costs (FC)	Variable Costs (VC)	Total Cost (TC) (FC + VC)		Marginal Cost (MC) ($\Delta TC/\Delta q$)	Average Fixed Costs (AFV) (FC/q)	Average Variable Costs (AVC) (VC/q)	Average Cost (AC) (AFC + AVC)
0	0		825	0	825					
1	80	→ 80	825	140	965	→ 140	1.75	10.31	1.75	12.06
2	200	→ 120	825	300	1125	→ 160	1.33	4.13	1.50	5.63
3	250	→ 50	825	425	1250	→ 125	2.50	3.30	1.70	5.00
4	270	→ 20	825	535	1360	→ 110	5.50	3.06	1.98	5.04
5	280	→ 10	825	640	1465	→ 105	1050	2.95	2.29	5.24

The Family of Short-Run Cost Curves

Figure 4.8, page 102



Returns to Scale (a)

- All inputs can be changed by the same proportion in the long run
 - increasing returns to scale means the % change in output $>$ the % change in inputs
 - constant returns to scale means the % change in output $=$ the % change in inputs
 - decreasing returns to scale means the % change in output $<$ the % change in inputs

Returns to Scale (b)

- Increasing returns to scale are caused by the division of labour or specialized capital or specialized management
- Constant returns to scale arise whenever making more of a product means repeating exactly the same tasks
- Decreasing returns to scale are caused by management difficulties or limited natural resources

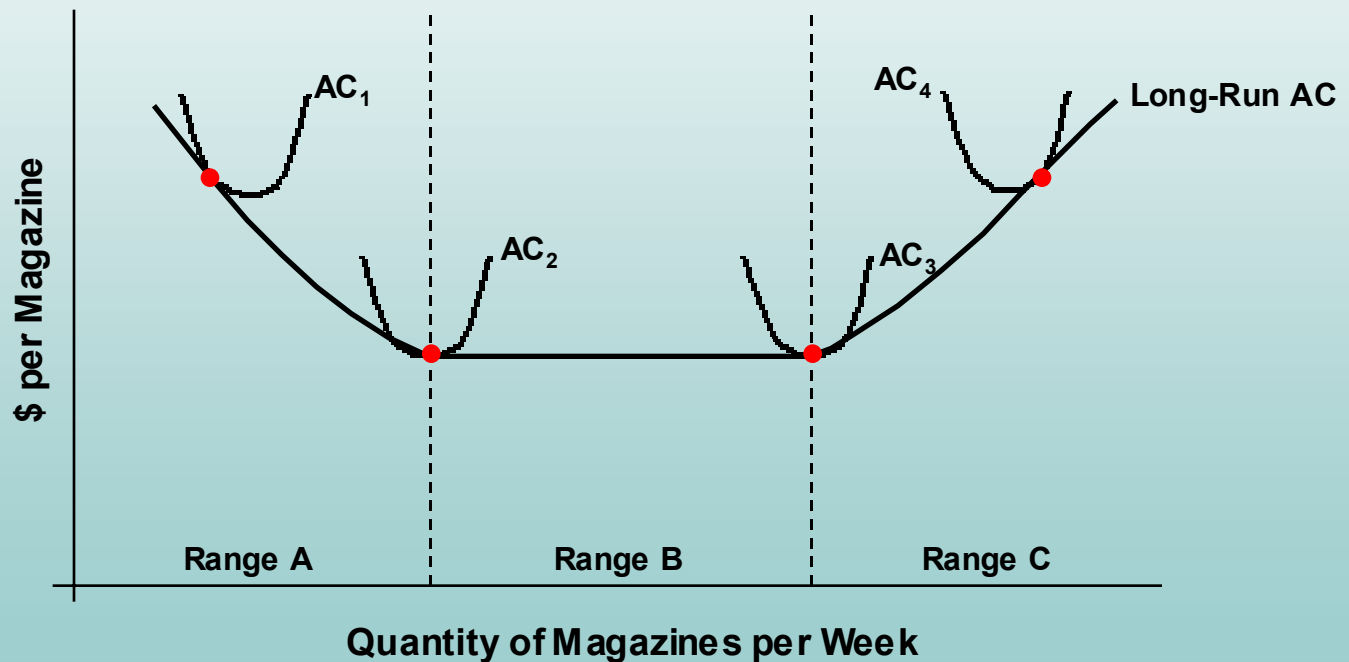
Costs in the Long Run (a)

- Long-run average cost is the minimum short-run average cost at every output
- The long-run average cost curve is saucer-shaped because of various ranges of returns to scale
 - initial range of increasing returns to scale
 - middle range of constant returns to scale
 - final range of decreasing returns to scale

Costs in the Long Run (b)

Figure 4.9, page 105

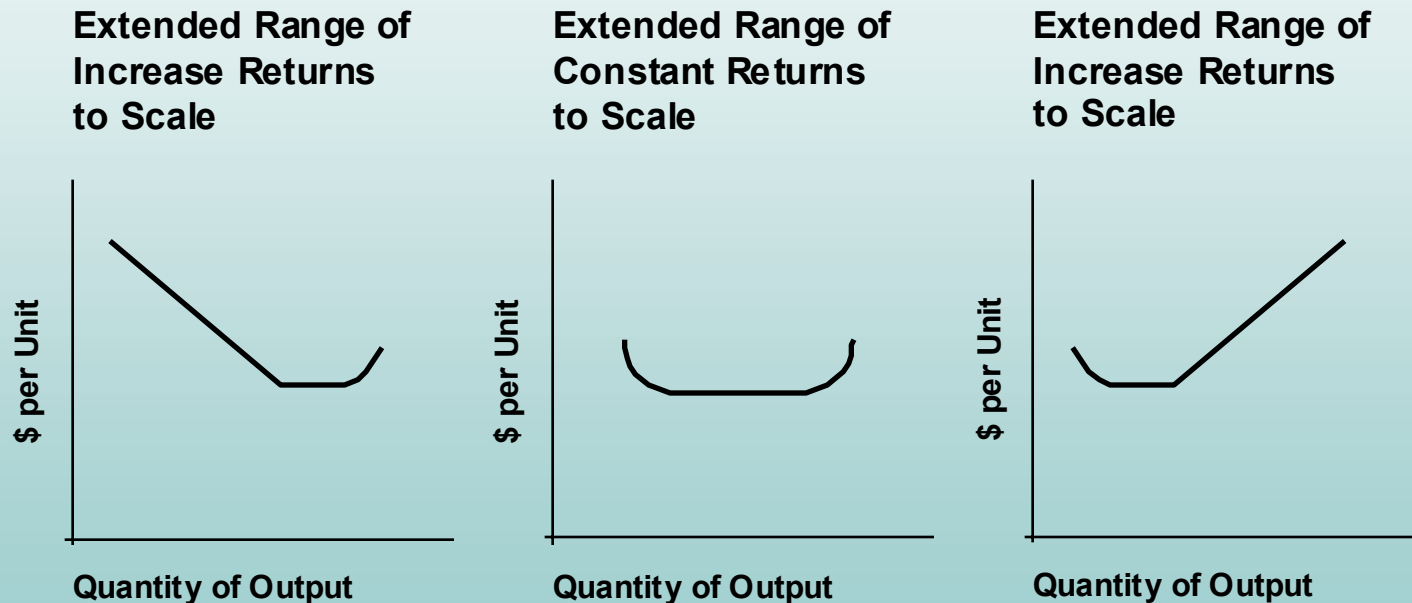
Long-Run Average Costs



Costs in the Long Run (b)

Figure 4.9, page 97

Possible Long-Run Average Costs



Critic of the Modern Corporation

- John Kenneth Galbraith
 - suggests that ownership and control are separated in large corporations
 - argues that shareholders (the owners) give up control to managers
 - holds out the possibility that managers are more interested in maximizing sales than in maximizing profit

Measuring Business Performance (a)

- Economists and accountants differ in the way they measure business performance.
- For accountants, there are two main business records:
 - a balance sheet shows a business's assets, or items that it owns. It also lists a business's liabilities, or items that it owes, as well as owner's equity, which is the owner's stake in the business

Income Statement for Jumbo Hotdogs

Figure A, Page 113

Income Statement (for the year 2001)

Total Sales		\$50 000
Expenses		
Food	\$ 15 000	
Fuel	3 500	
Depreciation	1 000	
Interest on loan	<u>500</u>	
Total explicit costs		<u>\$20 000</u>
Total profit		<u><u>\$ 30 000</u></u>

Measuring Business Performance (b)

- An income statement shows a business's activities in a given time period, with total sales (or revenue) and total expenses, which are its explicit costs.
- One important explicit cost is depreciation, or the reduction in the value of a business's durable assets.
 - For these assets (excluding land), an annual depreciation charge is included in the income statement as an expense.

Calculation of Economic Profit for Jumbo Hotdogs

Figure B, Page 114

Total Revenue		\$50 000
Explicit Costs		
Food	\$ 15 000	
Fuel	3 500	
Depreciation	1 000	
Interest on loan	<u>500</u>	
Total explicit costs		\$20 000
Implicit Costs		
Owner's wage	\$ 25 000	
Normal profit	<u>3 000</u>	
Total implicit costs		<u>\$28 000</u>
Economic Profit		<u><u>\$ 2 000</u></u>

Accounting versus Economic Profit

- Accounting profit is total revenue minus explicit costs
- Because accountants only consider explicit costs, accounting profit always exceeds economic profit by the amount of the business's implicit costs.



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Chapter 4 **The End**

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