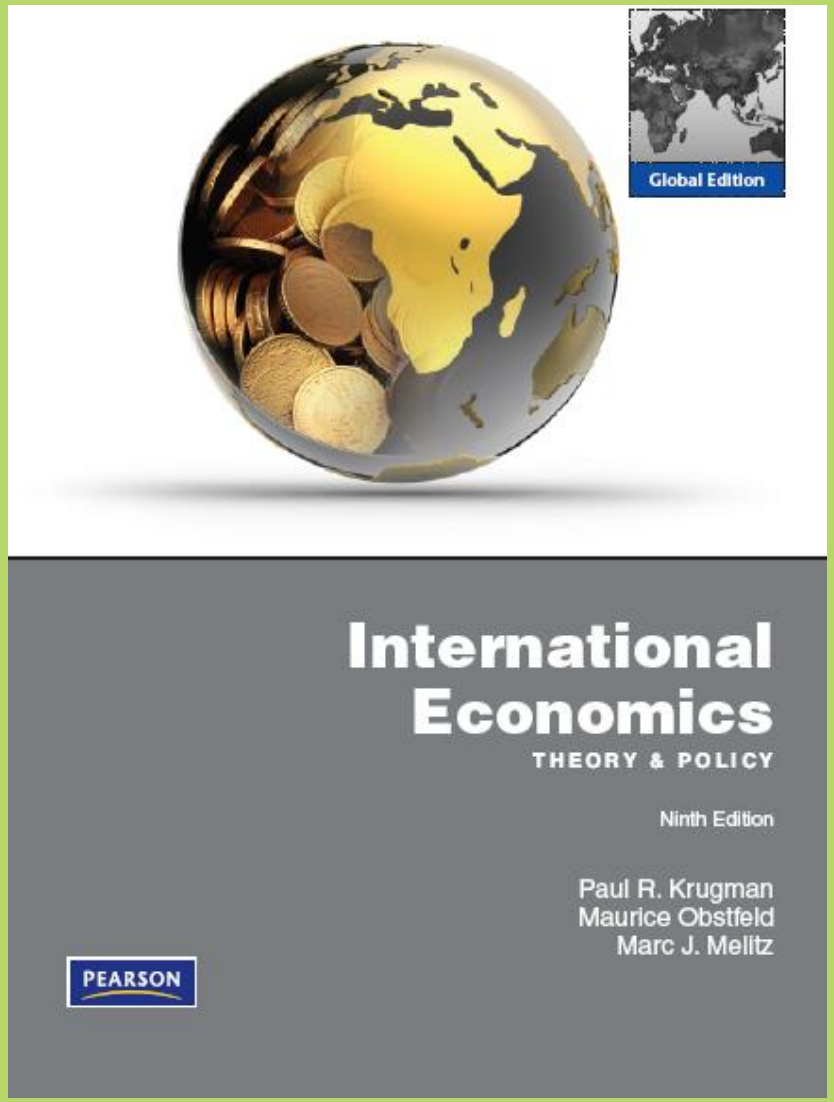
Chapter 7-8

Economies of Scale and Monopolistic Competition



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Introduction

- The models of comparative advantage thus far assumed **constant returns to scale**:
  - When inputs to an industry increase at a certain rate, output increases at the same rate.
  - If inputs were doubled, output would double as well.

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Introduction (cont.)

- But there may be **increasing returns to scale** or **economies of scale:**
  - This means that when inputs to an industry increase at a certain rate, output increases at a faster rate.
  - A larger scale is more efficient: the cost per unit of output falls as a firm or industry increases output.

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Introduction (cont.)

- For example, suppose an industry produces widgets using only one input, labor.
- Consider how the amount of labor required depends on the number of widgets produced.
- The presence of economies of scale may be seen from the fact that
  - doubling the input of labor more than doubles the industry's output.
  - the average amount of labor used to produce each widget is less when the industry produces more.

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Table 7-1: Relationship of Input to Output for a Hypothetical Industry

TABLE 7-1 Relationship of Input to Output for a Hypothetical Industry

Output	Total Labor Input	Average Labor Input
5	10	2
10	15	1.5
15	20	1.333333
20	25	1.25
25	30	1.2
30	35	1.166667

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Introduction (cont.)

- Mutually beneficial trade can arise as a result of economies of scale.
- International trade permits each country to produce a limited range of goods without sacrificing variety in consumption.
- With trade, a country can take advantage of economies of scale to produce more efficiently than if it tried to produce everything for itself.

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Introduction (cont.)

- Economies of scale could mean either that larger firms or a larger industry would be more efficient.
- **External economies of scale** occur when cost per unit of output depends on the *size of the industry*.
- **Internal economies of scale** occur when the cost per unit of output depends on the *size of a firm*.

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Introduction (cont.)

- When economies of scale exist, large firms may be more efficient than small firms, and the industry may consist of a monopoly or a few large firms.
  - Production may be imperfectly competitive in the sense that excess or monopoly profits are captured by large firms.
- Internal economies of scale result when large firms have a cost advantage over small firms, causing the industry to become uncompetitive.

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Introduction (cont.)

- Internal economies of scale imply that a firm's average cost of production decreases the more output it produces.
- Perfect competition that drives the price of a good down to marginal cost would imply losses for those firms because they would not be able to recover the higher costs incurred from producing the initial units of output.
- As a result, perfect competition would force those firms out of the market.

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The Theory of Imperfect Competition

- In imperfect competition, firms are aware that they can influence the prices of their products and that they can sell more only by reducing their price.
- This situation occurs when there are only a few major producers of a particular good or when each firm produces a good that is differentiated from that of rival firms.
- Each firm views itself as a price setter, choosing the price of its product.

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Monopoly: A Brief Review

- A **monopoly** is an industry with only one firm.
- An **oligopoly** is an industry with only a few firms.
- In these industries, the marginal revenue generated from selling more products is less than the uniform price charged for each product.
  - To sell more, a firm must lower the price of all units, not just the additional ones.
  - The marginal revenue function therefore lies below the demand function (which determines the price that customers are willing to pay).

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Monopoly: A Brief Review

- Assume that the **demand curve** the firm faces is a straight line $Q = A - B(P)$, where Q is the number of units the firm sells, P the price per unit, and A and B are constants.
- **Marginal revenue** equals $MR = P - Q/B$.
- Suppose that **total costs** are $C = F + c(Q)$, where F is fixed costs, those independent of the level of output, and c is the constant marginal cost.

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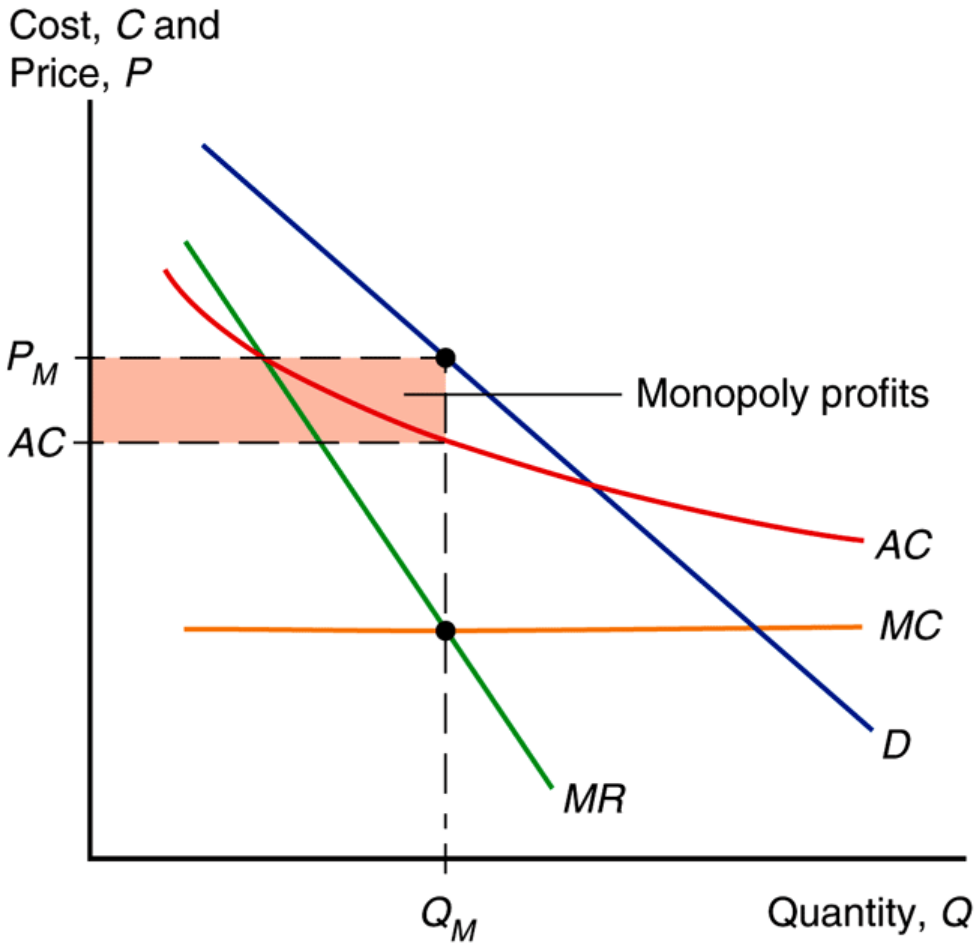
Fig. 8-1: Monopolistic Pricing and Production Decisions



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Monopoly: A Brief Review (cont.)

- **Average cost** is the cost of production (C) divided by the total quantity of production (Q).

$$AC = C/Q = F/Q + c$$

- **Marginal cost** is the cost of producing an additional unit of output.
- A larger firm is more efficient because average cost decreases as output Q increases: internal economies of scale.

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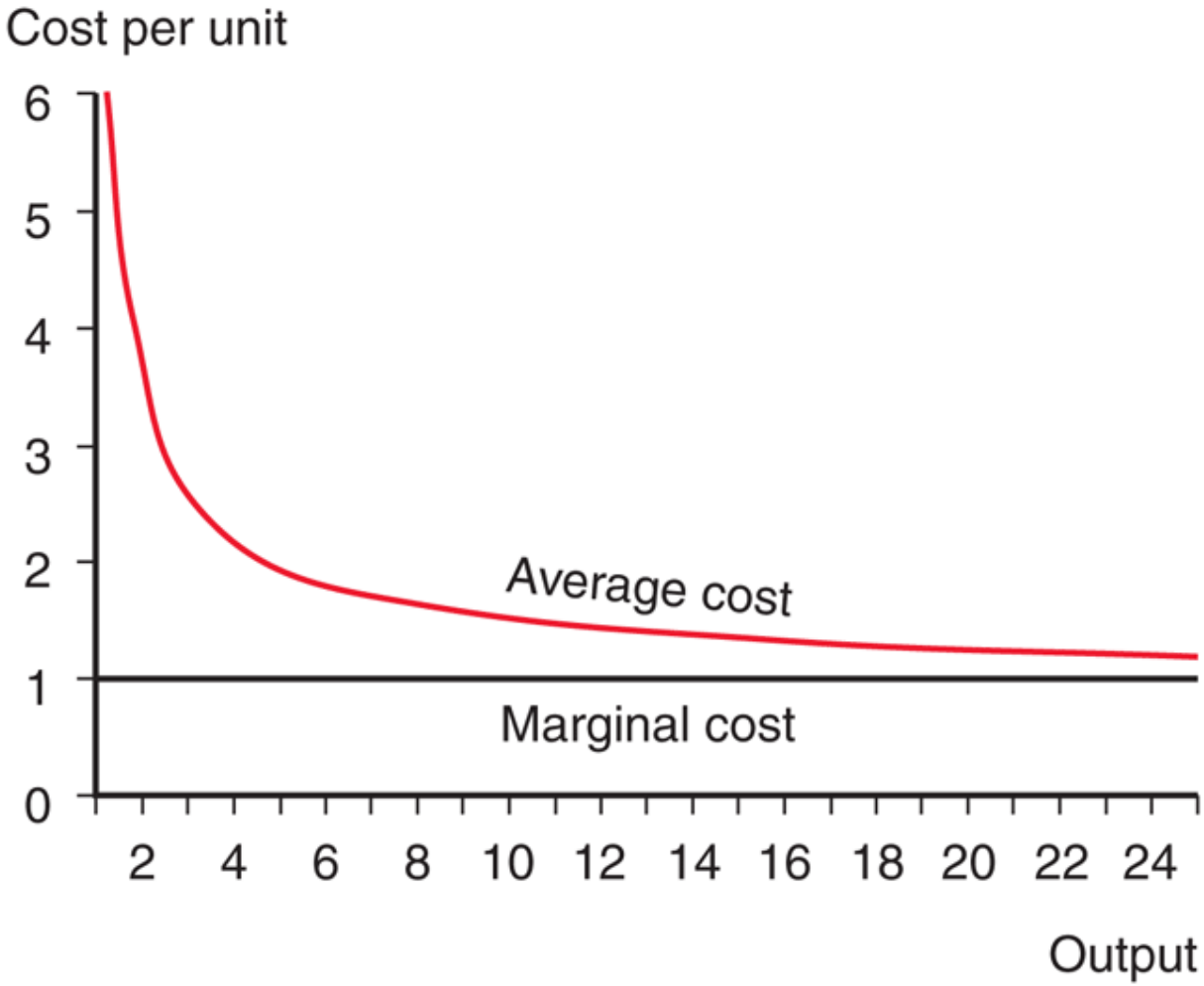
Fig. 8-2: Average Versus Marginal Cost



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Monopoly: A Brief Review (cont.)

- The profit-maximizing output occurs where marginal revenue equals marginal cost.
  - At the intersection of the *MC* and *MR* curves, the revenue gained from selling an extra unit equals the cost of producing that unit.

- The monopolist earns some monopoly profits, as indicated by the shaded box, when $P > AC$.

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Monopolistic Competition

- **Monopolistic competition** is a simple model of an imperfectly competitive industry that assumes that each firm
  1. can differentiate its product from the product of competitors, and
  2. takes the prices charged by its rivals as given.

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Monopolistic Competition (cont.)

- A firm in a monopolistically competitive industry is expected to sell
  - **more** as total sales in the industry increase and as prices charged by rivals increase.
  - **less** as the number of firms in the industry decreases and as the firm's price increases.
- These concepts are represented by the function:

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Monopolistic Competition (cont.)

$$Q = S[1/n - b(P - \overline{P})]$$

- Q is an individual firm's sales
- S is the total sales of the industry
- n is the number of firms in the industry
- b is a constant term representing the responsiveness of a firm's sales to its price
- P is the price charged by the firm itself
- $\overline{P}$ is the average price charged by its competitors

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Monopolistic Competition (cont.)

- Assume that firms are symmetric: all firms face the same demand function and have the same cost function.
  - Thus all firms should charge the same price and have equal share of the market $Q = S/n$
  - Average costs should depend on the size of the market and the number of firms:

$$AC = C/Q = F/Q + c = n\,F/S + c$$

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Monopolistic Competition (cont.)

$$AC = n(F/S) + c$$

- As the number of firms *n* in the industry increases, the average cost increases for each firm because each produces less.
- As total sales *S* of the industry increase, the average cost decreases for each firm because each produces more.

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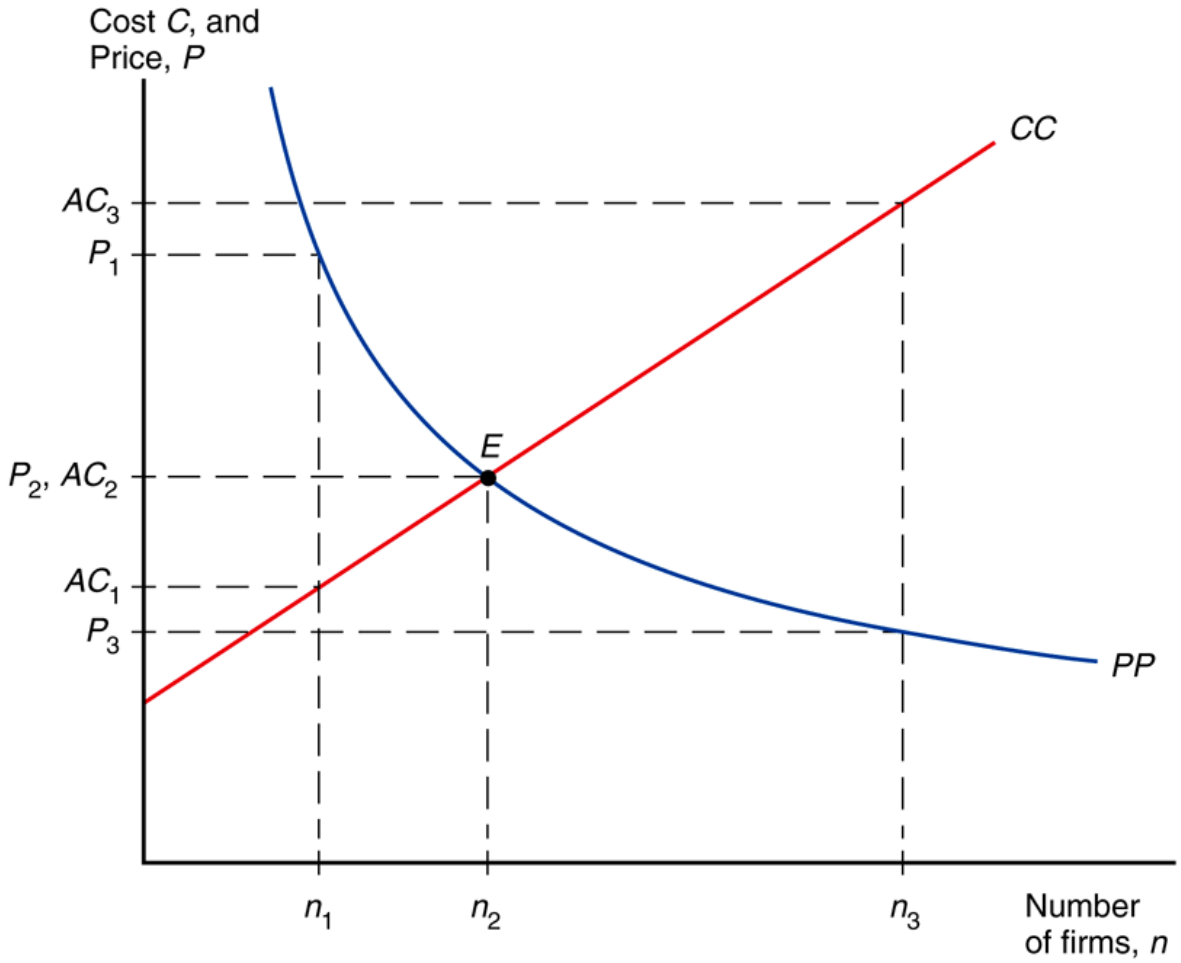
Fig. 8-3: Equilibrium in a Monopolistically Competitive Market



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Monopolistic Competition (cont.)

- If monopolistic firms face linear demand functions, $Q = A - B(P)$,
  - where A and B are constants.
- When firms maximize profits, they should produce until marginal revenue equals marginal cost:

$$MR = P - Q/B = c$$

- As the number of firms n in the industry increases, the price that each firm charges decreases because of increased competition.

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Monopolistic Competition (cont.)

- At some number of firms, the price that firms charge (which decreases in *n*) matches the average cost that firms pay (which increases in *n*).
  - At this long-run equilibrium number of firms in the industry, firms have no incentive to enter or exit the industry.

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Monopolistic Competition (cont.)

- If the number of firms is greater than or less than the equilibrium number, then firms have an incentive to exit or enter the industry.
  - Firms have an incentive to exit the industry when price < average cost.
  - Firms have an incentive to enter the industry when price > average cost.

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Monopolistic Competition and Trade

- Because trade increases market size, trade is predicted to decrease average cost in an industry described by monopolistic competition.
  - Industry sales increase with trade leading to decreased average costs: $AC = n(F/S) + c$
- Because trade increases the variety of goods that consumers can buy under monopolistic competition, it increases the welfare of consumers.
  - And because average costs decrease, consumers can also benefit from a decreased price.

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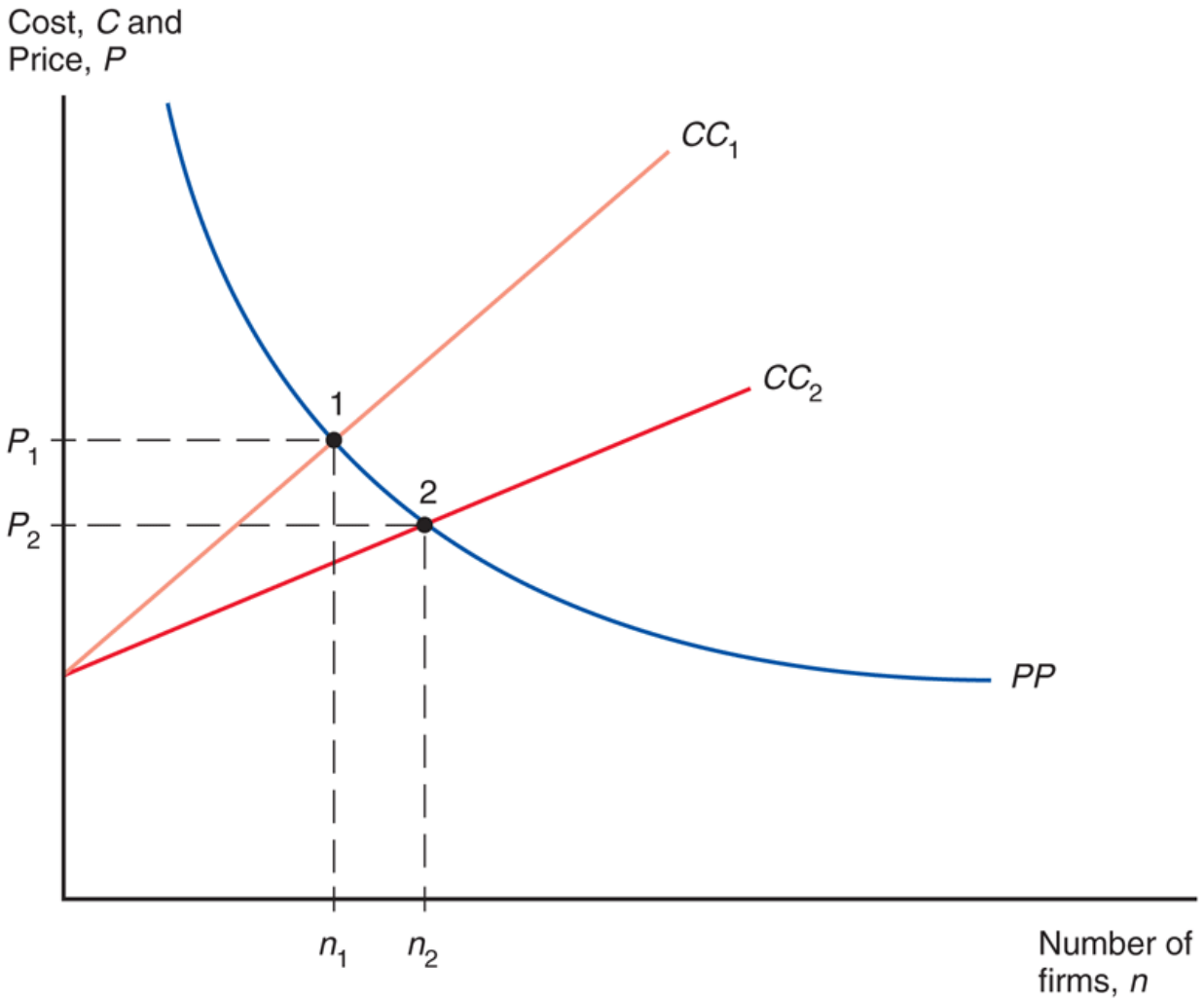
Fig. 8-4: Effects of a Larger Market



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Monopolistic Competition and Trade (cont.)

- As a result of trade, the number of firms in a new international industry is predicted to increase relative to each national market.
  - But it is unclear if firms will locate in the domestic country or foreign countries.
- Integrating markets through international trade therefore has the same effects as growth of a market within a single country.

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Fig. 8-5: Equilibrium in the Automobile Market

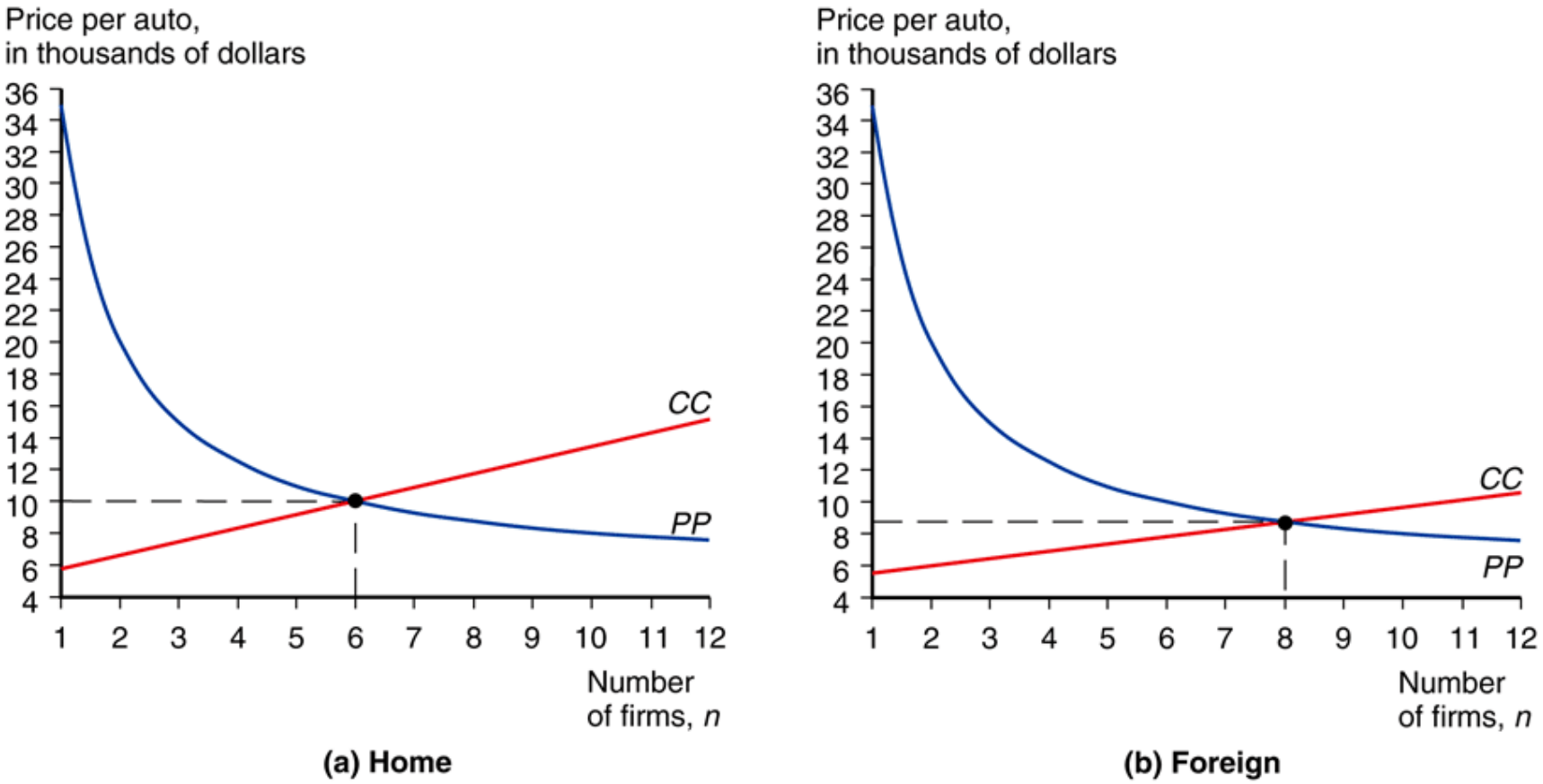

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Fig. 8-5: Equilibrium in the Automobile Market (cont.)

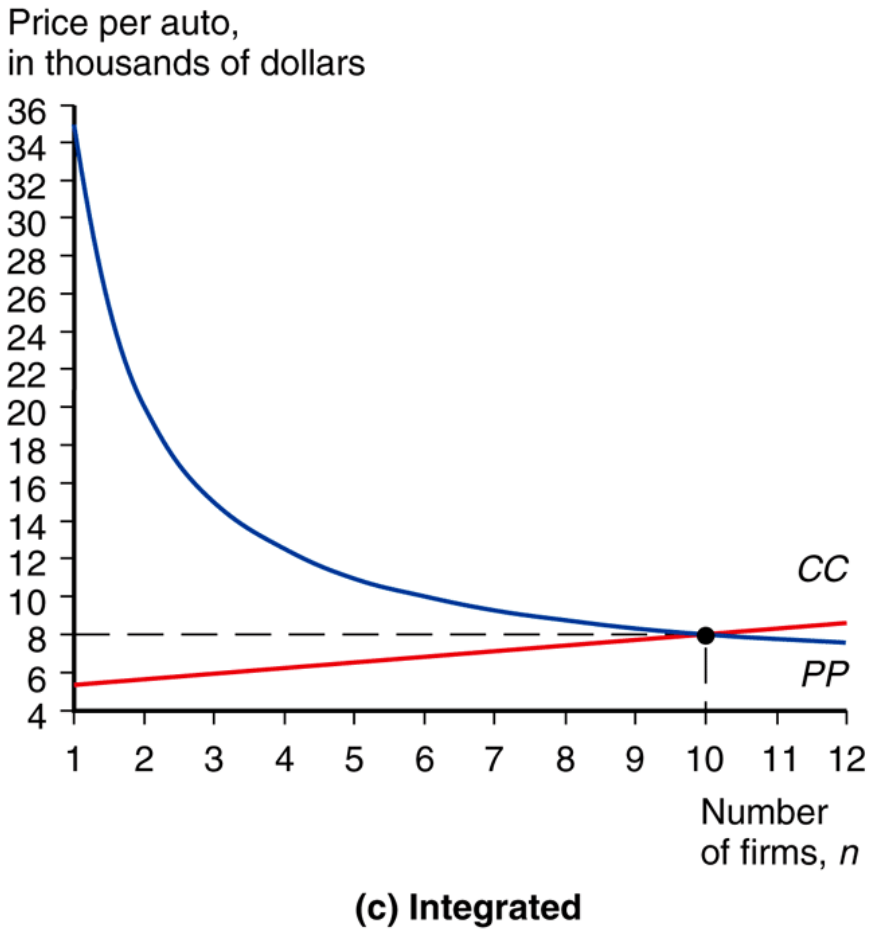

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Table 8-1: Hypothetical Example of Gains from Market Integration

TABLE 8-1 Hypothetical Example of Gains from Market Integration

	Home Market, Before Trade	Foreign Market, Before Trade	Integrated Market, After Trade
Industry output (# of autos)	900,000	1,600,000	2,500,000
Number of firms	6	8	10
Output per firm (# of autos)	150,000	200,000	250,000
Average cost	$10,000	$8,750	$8,000
Price	$10,000	$8,750	$8,000

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Monopolistic Competition and Trade (cont.)

- Product differentiation and internal economies of scale lead to trade between similar countries with no comparative advantage differences between them.
  - This is a very different kind of trade than the one based on comparative advantage, where each country exports its comparative advantage good.

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Intra-industry Trade

- **Intra-industry trade** refers to two-way exchanges of similar goods.
- Two new channels for welfare benefits from trade:
  - Benefit from a greater variety at a lower price.
  - Firms consolidate their production and take advantage of economies of scale.
- A smaller country stands to gain more from integration than a larger country.

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Economies of Scale and Comparative Advantage

- Assumptions:
  - There are two countries: Home (the capital-abundant country) and Foreign.
  - There are two industries: manufactures (the capital-intensive industry) and food.
  - Neither country is able to produce the full range of manufactured products by itself due to economies of scale.

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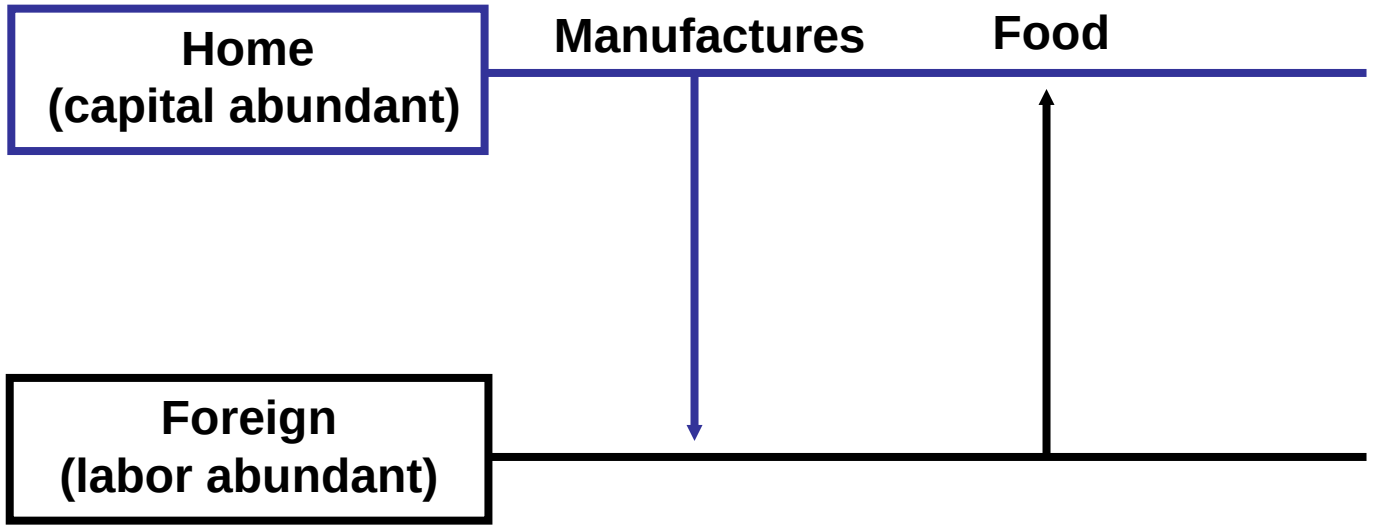
Trade in a World Without Increasing Returns



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Intra- vs. Inter-Industry Trade

- If manufactures is a monopolistically competitive sector, world trade consists of two parts:
  - **Intraindustry trade**
    - The exchange of manufactures for manufactures
  - **Interindustry trade**
    - The exchange of manufactures for food

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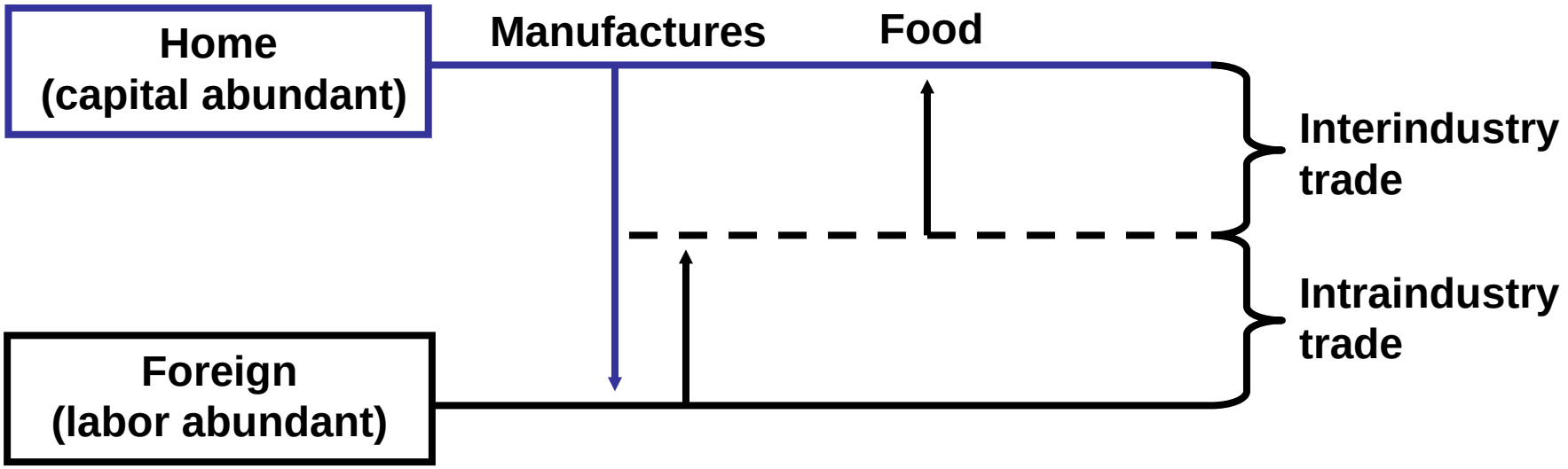
Trade with Increasing Returns and Monopolistic Competition



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Difference Between Intra- and Inter-industry Trade

- Main differences between interindustry and intraindustry trade:
  - Interindustry trade reflects comparative advantage, whereas intraindustry trade does not.
  - The pattern of intraindustry trade itself is unpredictable, whereas that of interindustry trade is determined by underlying differences between countries.
  - The relative importance of intraindustry and interindustry trade depends on how similar countries are.

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The Significance of Intra-industry Trade

- About 25–50% of world trade is intra-industry.
- Most prominent is the trade of manufactured goods among advanced industrial nations, which accounts for the majority of world trade.
  - For the United States, industries that have the most intra-industry trade—such as pharmaceuticals, chemicals, and specialized machinery—require relatively larger amounts of skilled labor, technology, and physical capital.

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Table 8-2: Indexes of Intra-Industry Trade for U.S. Industries, 2009

TABLE 8-2	Indexes of Intra-Industry Trade for U.S. Industries, 2009
Metalworking Machinery	0.97
Inorganic Chemicals	0.97
Power-Generating Machines	0.86
Medical and Pharmaceutical Products	0.85
Scientific Equipment	0.84
Organic Chemicals	0.79
Iron and Steel	0.76
Road Vehicles	0.70
Office Machines	0.58
Telecommunications Equipment	0.46
Furniture	0.30
Clothing and Apparel	0.11
Footwear	0.10

index: $1 - \frac{X_i - M_i}{X_i + M_i}$ X: export; M: import; i: industry

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Dumping

- **Dumping** is the practice of charging a lower price for exported goods than for goods sold domestically.
- Dumping is an example of **price discrimination**: the practice of charging different customers different prices.
- Price discrimination and dumping may occur only if
  - *imperfect competition* exists: firms are able to influence market prices.
  - *markets are segmented* so that goods are not easily bought in one market and resold in another.

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Dumping (cont.)

- Dumping can be a profit-maximizing strategy:
  - A firm with a higher marginal cost chooses to set a lower markup over marginal cost.
  - Therefore, an exporting firm will respond to the trade cost by lowering its markup for the export market.
  - This strategy is considered to be **dumping**, regarded by most countries as an "unfair" trade practice.

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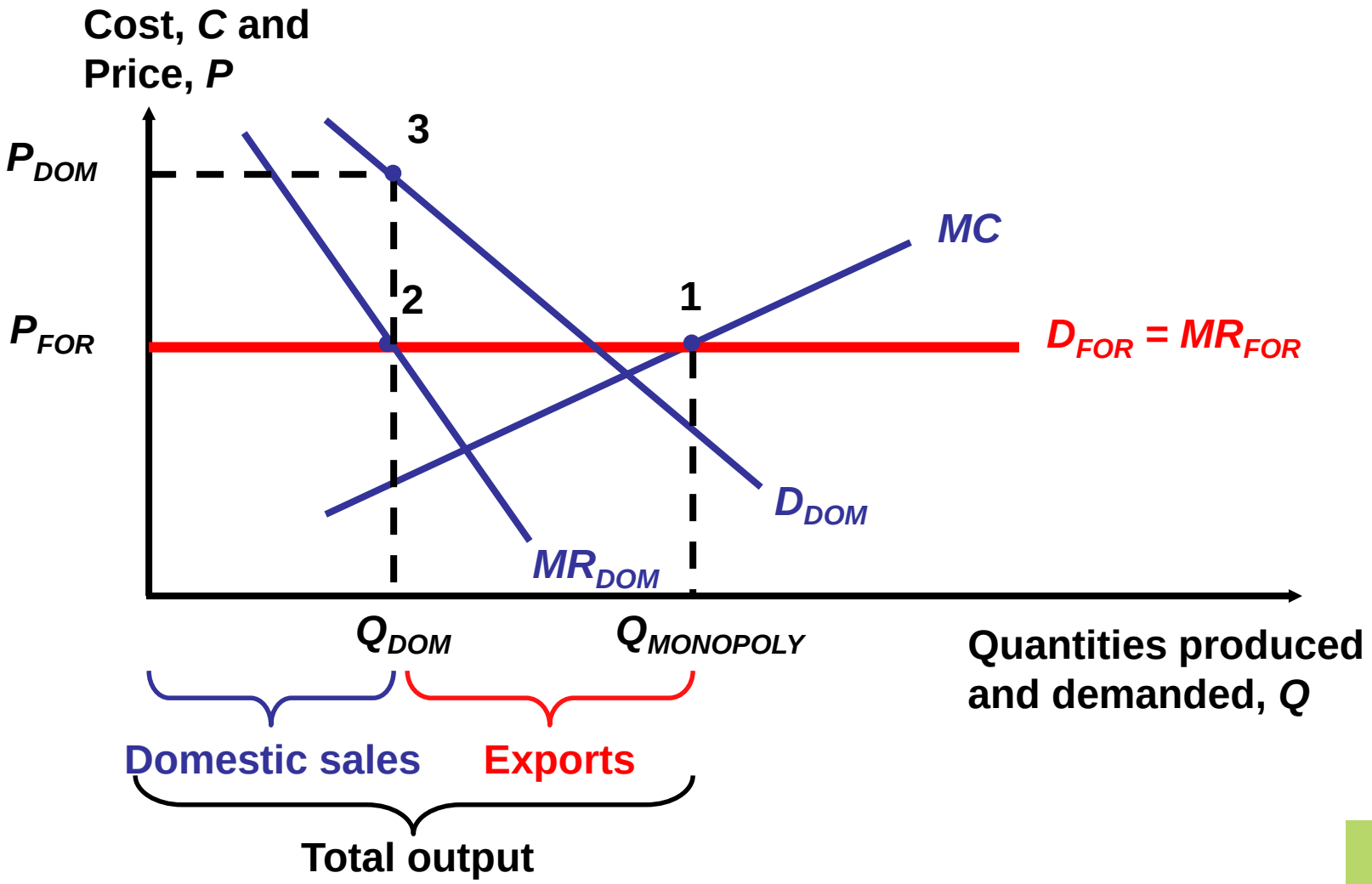
Dumping as Price Discrimination



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Protectionism and Dumping

- A U.S. firm may appeal to the Commerce Department to investigate if dumping by foreign firms has injured the U.S. firm.
  - The Commerce Department may impose an "anti-dumping duty" (tax) to protect the U.S. firm.
  - Tax equals the difference between the actual and "fair" price of imports, where "fair" means "price the product is normally sold at in the manufacturer's domestic market."

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Protectionism and Dumping (cont.)

- Next, the International Trade Commission (ITC) determines if injury to the U.S. firm has occurred or is likely to occur.
- If the ITC determines that injury has occurred or is likely to occur, the anti-dumping duty remains in place.

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Protectionism and Dumping (cont.)

- Most economists believe that the enforcement of dumping claims is misguided.
  - Trade costs have a natural tendency to induce firms to lower their markups in export markets.
  - Such enforcement may be used excessively as an excuse for protectionism.

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