

KRUGMAN | OBSTFELD | MELITZ
INTERNATIONAL
ECONOMICS
THEORY & POLICY



TENTH EDITION

ALWAYS LEARNING

Chapter 8

Firms in the Global Economy: Export Decisions, Outsourcing, and Multinational Enterprises

PEARSON



Introduction

- Internal economies of scale imply that a firm's average cost of production decreases the more output this firm produces.
- Internal economies of scale lead to a situation where large firms have a cost advantage over small firms, causing the industry to become uncompetitive.
- In an industry with internal economies of scale, there will be only a few producers and each of them will have a significant market power.



Preview

- Monopoly: A brief review
- Monopolistic competition and trade
- The significance of intra-industry trade
- Firm responses to trade: winners, losers, and industry performance
- Trade Costs and Export Decisions
- Multinationals, FDI, and outsourcing



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.



The Theory of Imperfect Competition

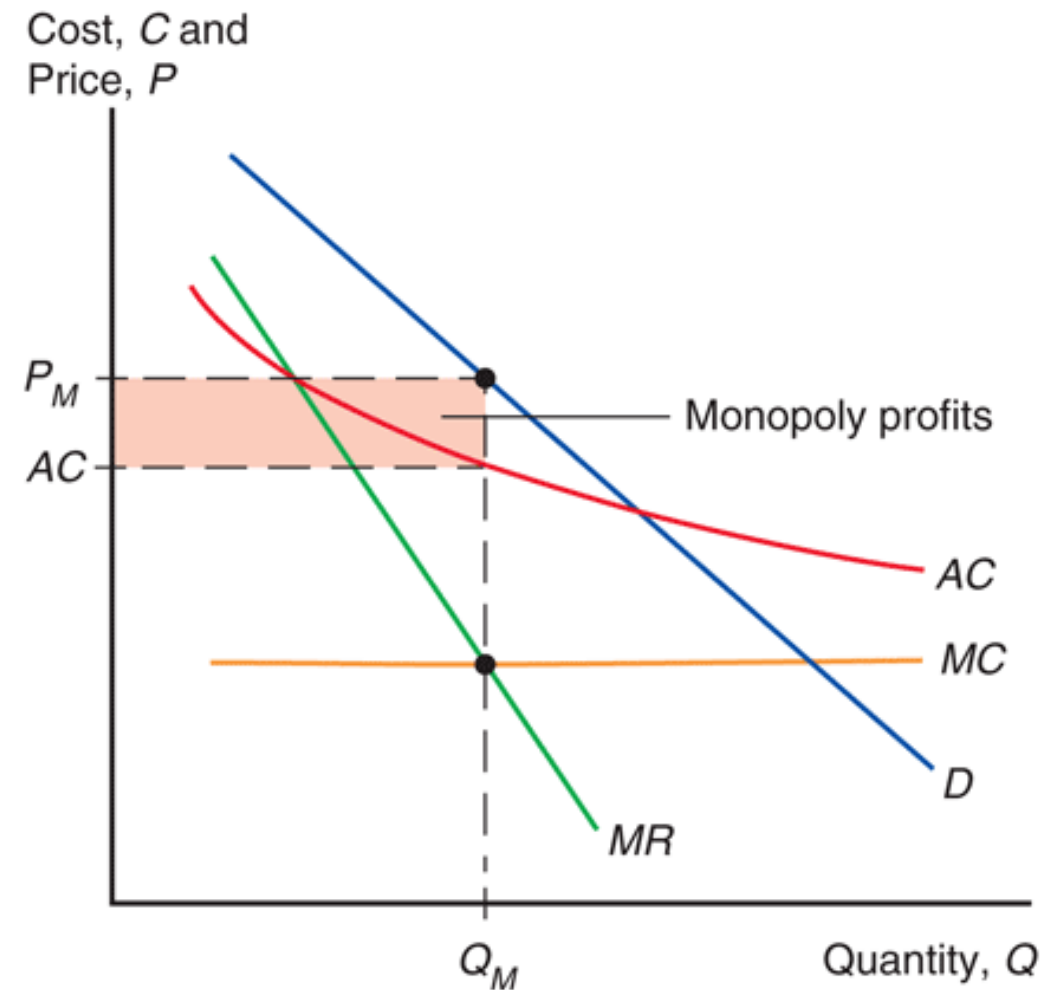
- A **monopoly** is an industry with only one firm.
- An **oligopoly** is an industry with only a few firms.
- In these industries, the marginal revenue generated from selling more products is less than the uniform price charged for each product.
 - To sell more, a firm must lower the price of all units, 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).



Monopoly: A Brief Review

- Assume that the **demand curve** the firm faces is a straight line $Q = A - B*P$, where Q is the quantity the firm sells, P the price per unit, 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**.
- **Average cost** is the cost of production (C) divided by the quantity of production (Q): $AC = C/Q = F/Q + c$
- A larger firm is more efficient because average cost decreases as output Q increases: internal economies of scale.

Fig. 8-1: Monopolistic Pricing and Production Decisions

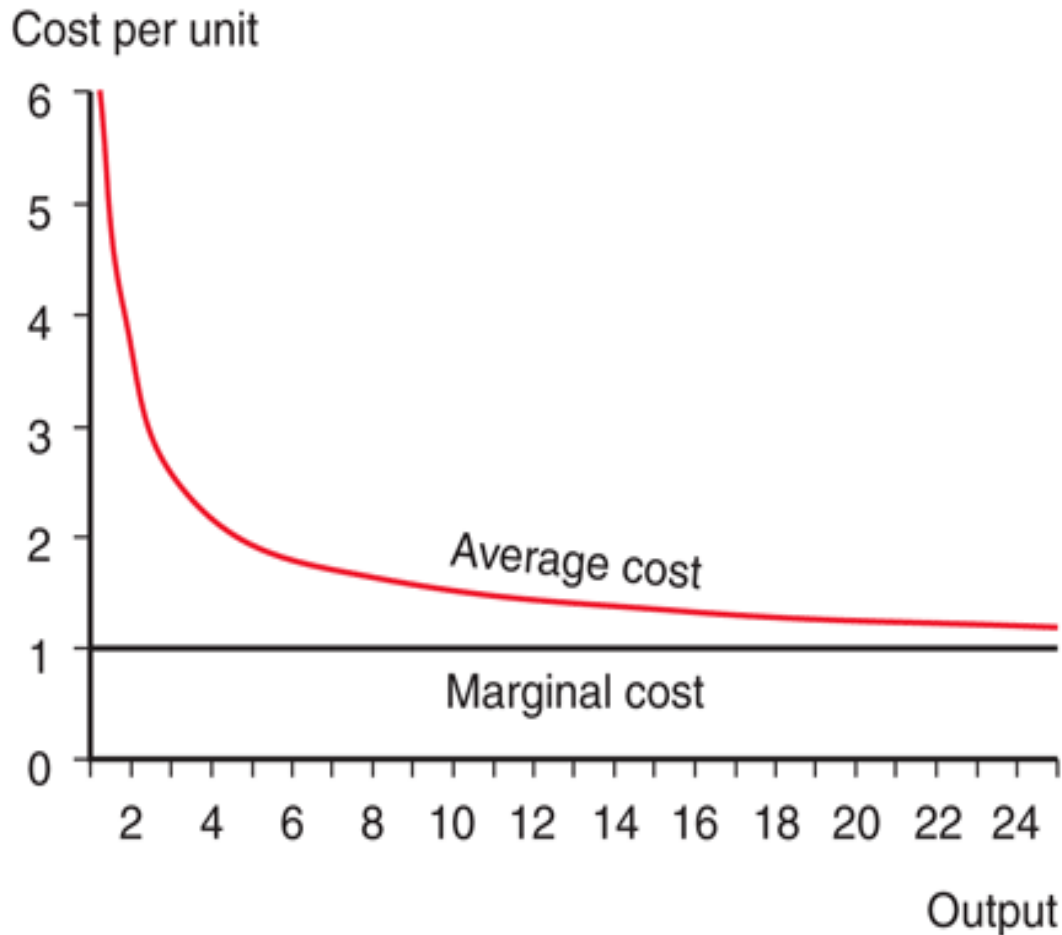


The profit-maximizing output occurs where marginal revenue equals marginal cost.

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 $P > AC$.

Fig. 8-2: Average Versus Marginal Cost



If the average cost of a firm is in the form $AC = C/Q = F/Q + c$ where c is constant marginal cost, then the average cost is always higher than the marginal cost.

This figure illustrates the average and marginal costs corresponding to the total cost function $C = 5 + Q$.



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.
- 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 increases and as the firm's price increases.



Monopolistic Competition

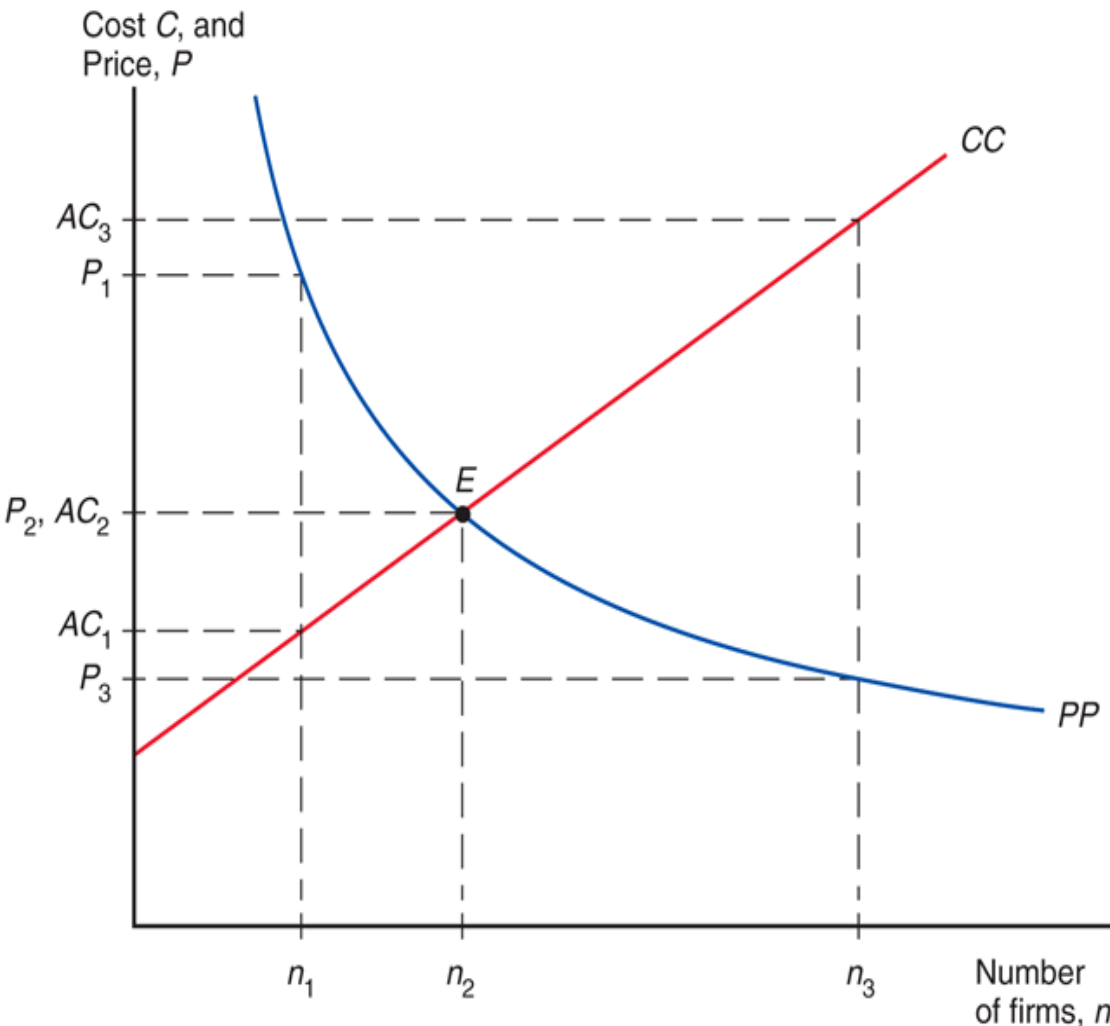
- These concepts are represented by the function:

$$Q = S*[1/n - b*(P - \bar{P})] \quad (8-5)$$

- 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
 - \bar{P} is the average price charged by its competitors
- We try to determine the equilibrium number of firms in the industry.



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



CC curve shows how average costs depend on the number of firms in an industry: With more firms in an industry, each firm produces less and the average cost of production therefore rises.

PP curve shows how price the firm charges depends on the number of firms in an industry: With more firms in an industry, there is more intense competition among them and the price therefore declines.



Monopolistic Competition – Derivation of CC Curve

- 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:
$$AC = C/Q = F/Q + c = n * F/S + c \quad (8-6)$$
 - 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.



Monopolistic Competition – Derivation of PP Curve

- The equation (8-5) can be written in the following form:

$$Q = [(S/n) + S^*b^*P] - S^*b^*P \quad (8-7)$$

- Note, that the equation (8-7) has the same form as linear demand function $Q = A - B^*P$

– where $A = [(S/n) + S^*b^*P]$ and $B = S^*b$.

- When firms maximize profits, they should produce until marginal revenue equals marginal cost:

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

- Substituting for $B = S^*b$ and $Q = S/n$ we get

$$P = c + 1/(b^*n) \quad (8-10)$$



Monopolistic Competition – Derivation of *PP* Curve

$$P = c + 1/(b*n) \quad (8-10)$$

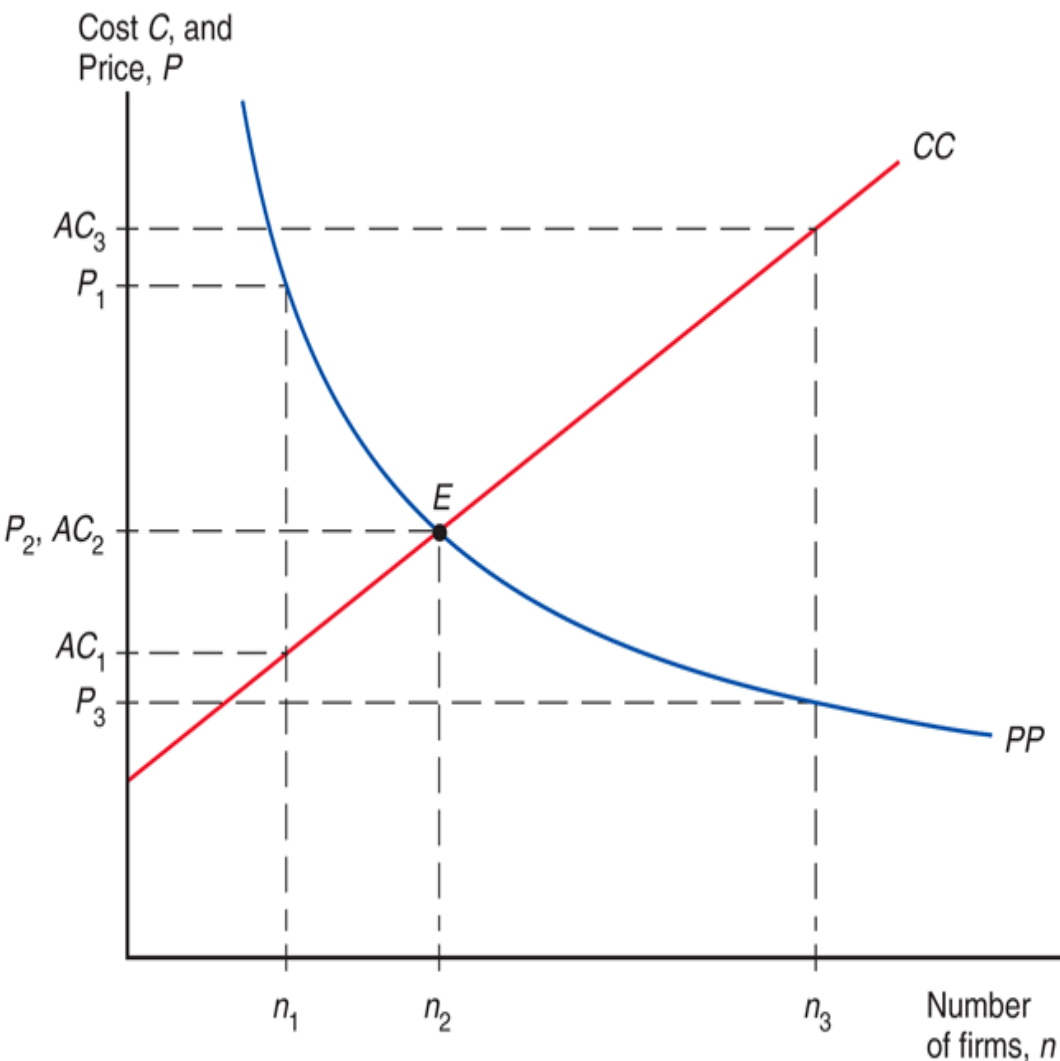
- As the number of firms n in the industry increases, the price that each firm charges decreases due to increased competition.
- Each firm's markup over marginal cost is equal

$$P - c = 1 / (b*n)$$

and decreases with the number of competing firms.



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



$$CC \text{ curve: } AC = n * F / S + c$$

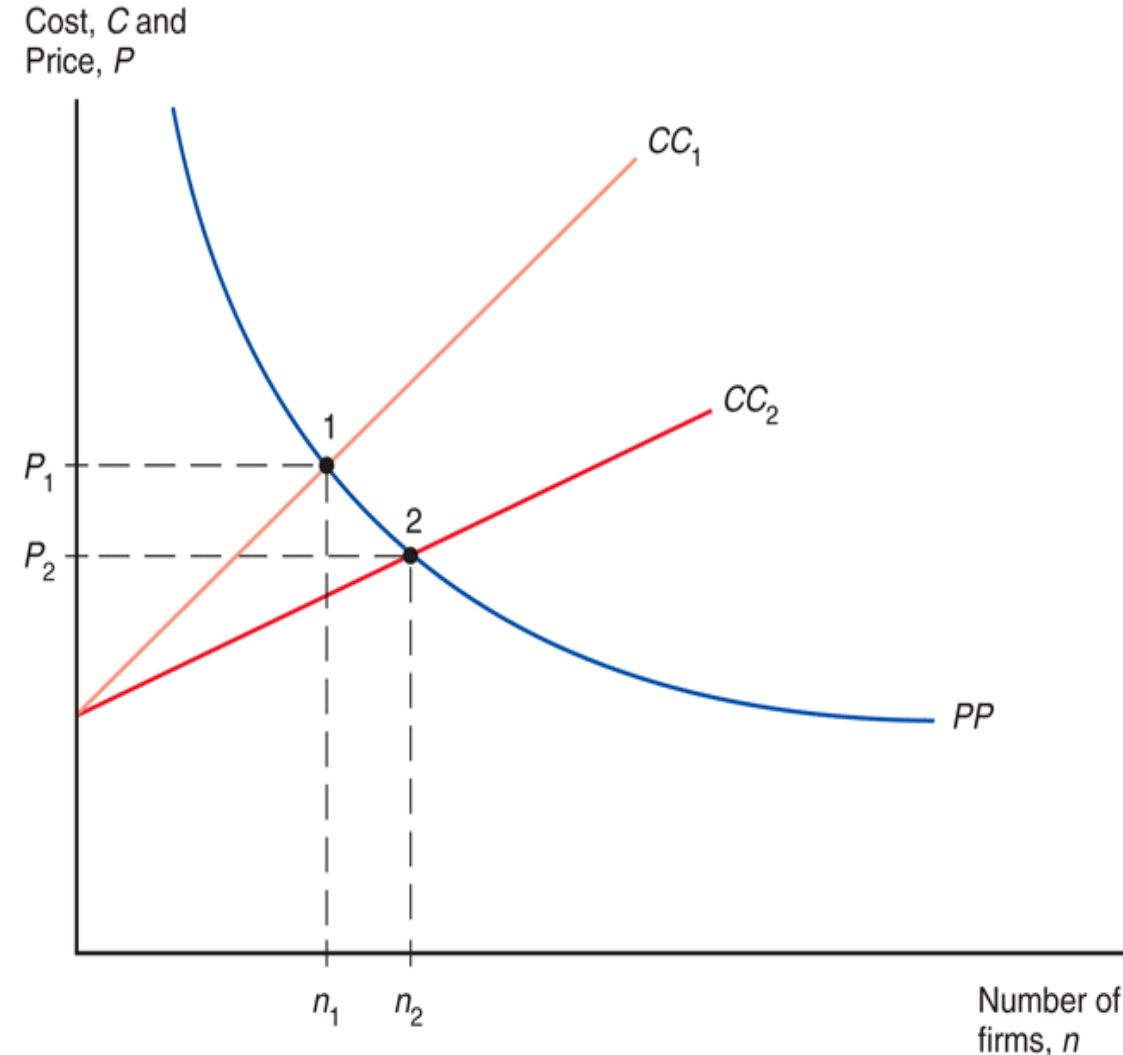
$$PP \text{ curve: } P = c + 1 / (b * n)$$

In equilibrium: $P=AC$ and firms have no incentive to enter or exit the industry.

If the number of firms is greater than the equilibrium number, $P < AC$ and firms have an incentive to exit the industry .

If the number of firms is less than the equilibrium number, $P > AC$ and firms have an incentive to enter the industry.

Fig. 8-4: Effects of a Larger Market



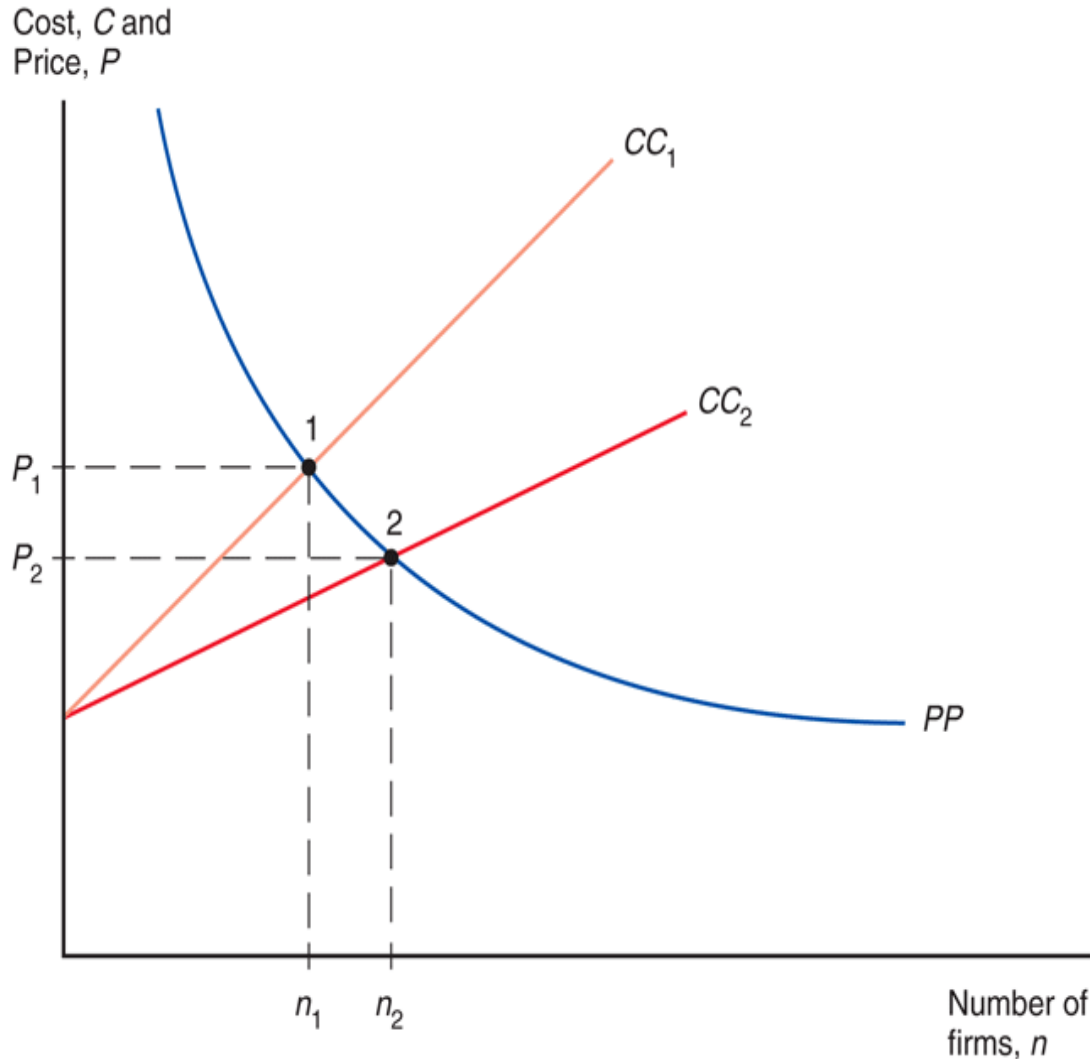
Because trade increases market size, trade is predicted to decrease average cost in an industry described by monopolistic competition.

$$AC = n * F / S + c.$$

And because average costs decrease, consumers can benefit from a decreased price.



Fig. 8-4: Effects of a Larger Market



As a result of trade, the number of firms in a new international industry is predicted to increase relative to each national market.

Because trade increases the variety of goods that consumers can buy under monopolistic competition, it increases the welfare of consumers.

But it is unclear if firms will locate in the domestic country or foreign countries.



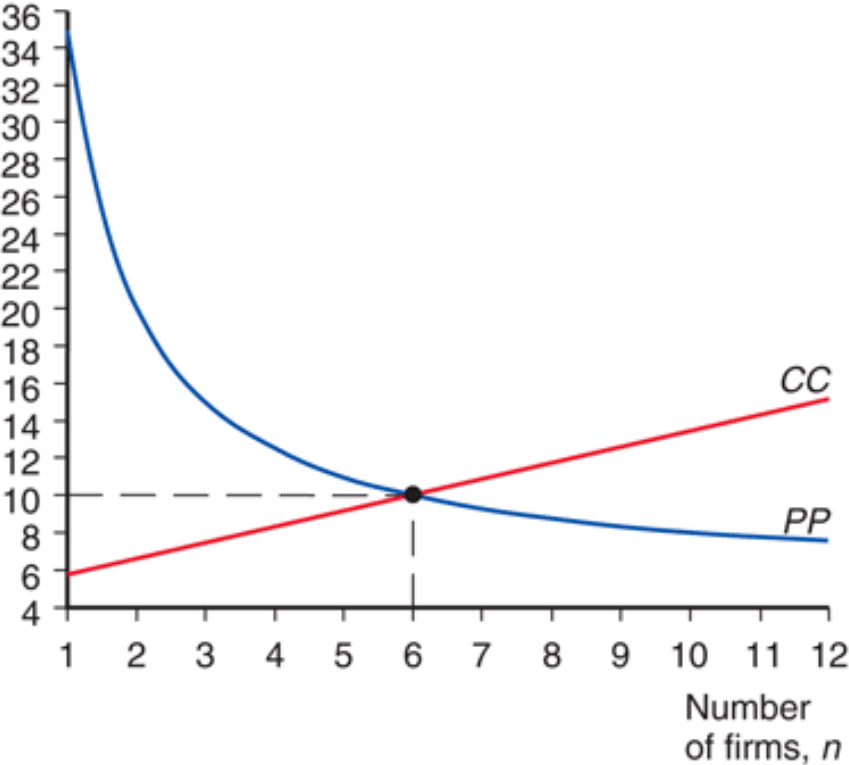
Gains from an Integrated Market: A Numerical Example

- Suppose that $b = 1/30000$, fixed cost $F = \$750,000,000$ and a marginal cost of $c = \$5,000$ per automobile.
- The total cost is $C = 750,000,000 + (5,000 * Q)$.
- The average cost is therefore
$$AC = (750,000,000/Q) + 5,000.$$
- Suppose there are two countries, Home and Foreign.
- Home has annual sales of 900,000 automobiles; Foreign has annual sales of 1.6 million.
- The two countries are assumed (for now) to have the same costs of production.



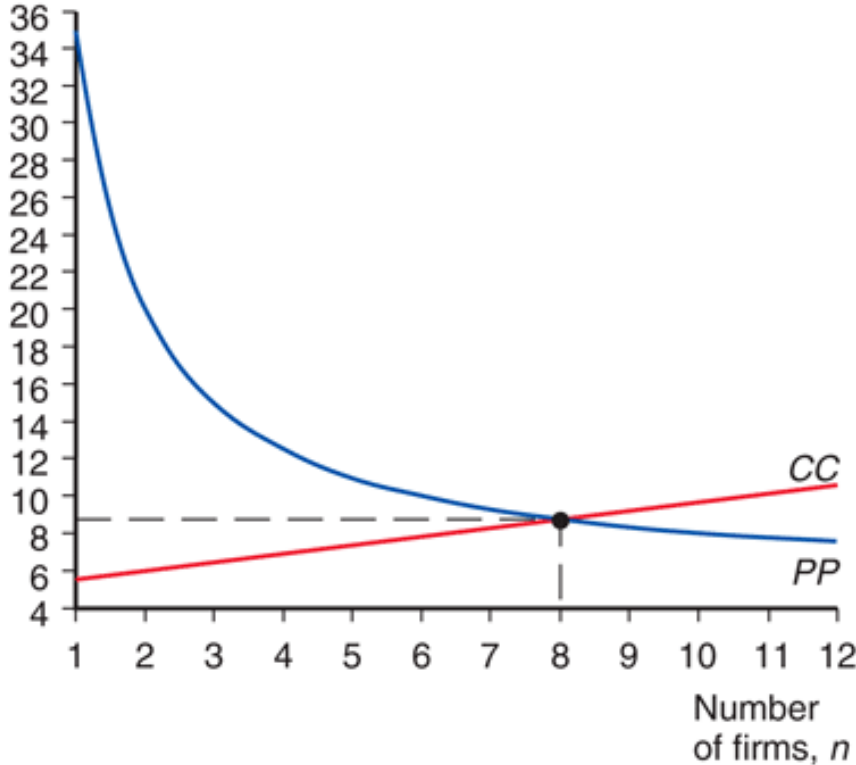
Fig. 8-5: Equilibrium in the Automobile Market

Price per auto, in thousands of dollars



(a) Home

Price per auto, in thousands of dollars

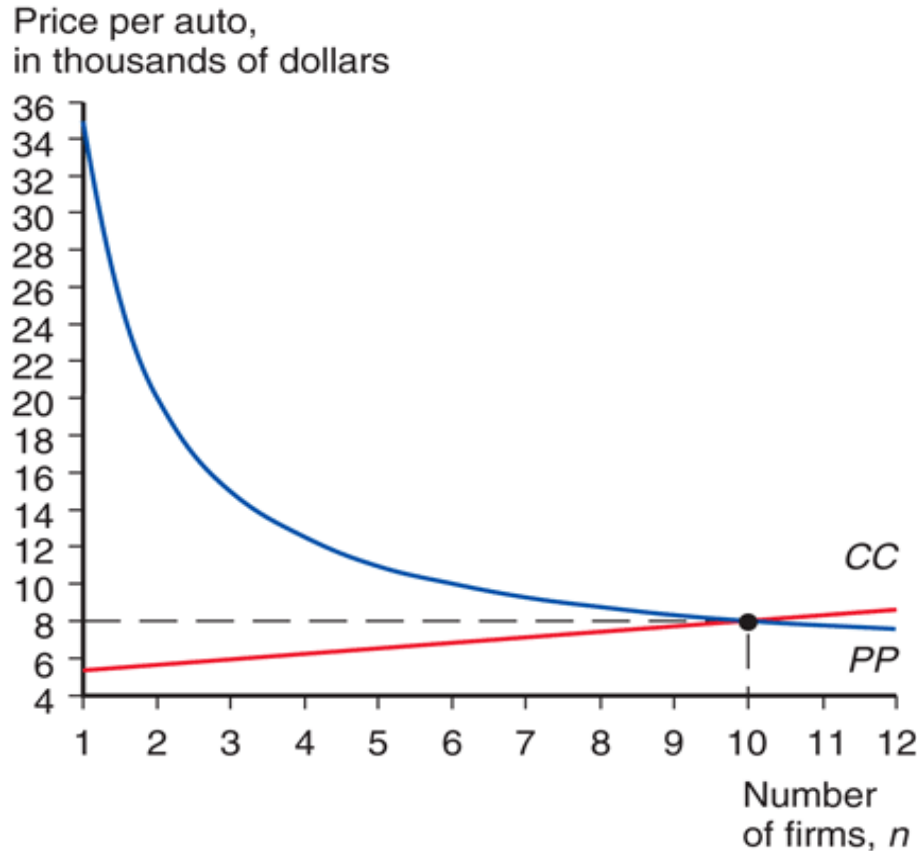


(b) Foreign

$$AC = n * F / S + c$$
$$AC = n * 750000 / 900000 + 5$$

$$AC = n * 750000 / 1600000 + 5$$

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



(c) Integrated

$$AC = n * 750000 / 2500000 + 5$$

The integrated market supports more firms, each producing at a larger scale and selling at a lower price than either national market does on its own.

Everyone is better off as a result of the larger market with integration:

Consumers have a wider range of choices.

Each firm produces more and is therefore able to offer its product at a lower price.



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



The Significance of Intra-Industry Trade

- 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.
- **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.



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.
- Broda, Weinstein (2006) estimated that the number of available products in U.S. imports tripled between 1972 and 2001.
 - They also estimated that this increased product variety for U.S. consumers represented a welfare gain equal to 2.6% of U.S. GDP



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

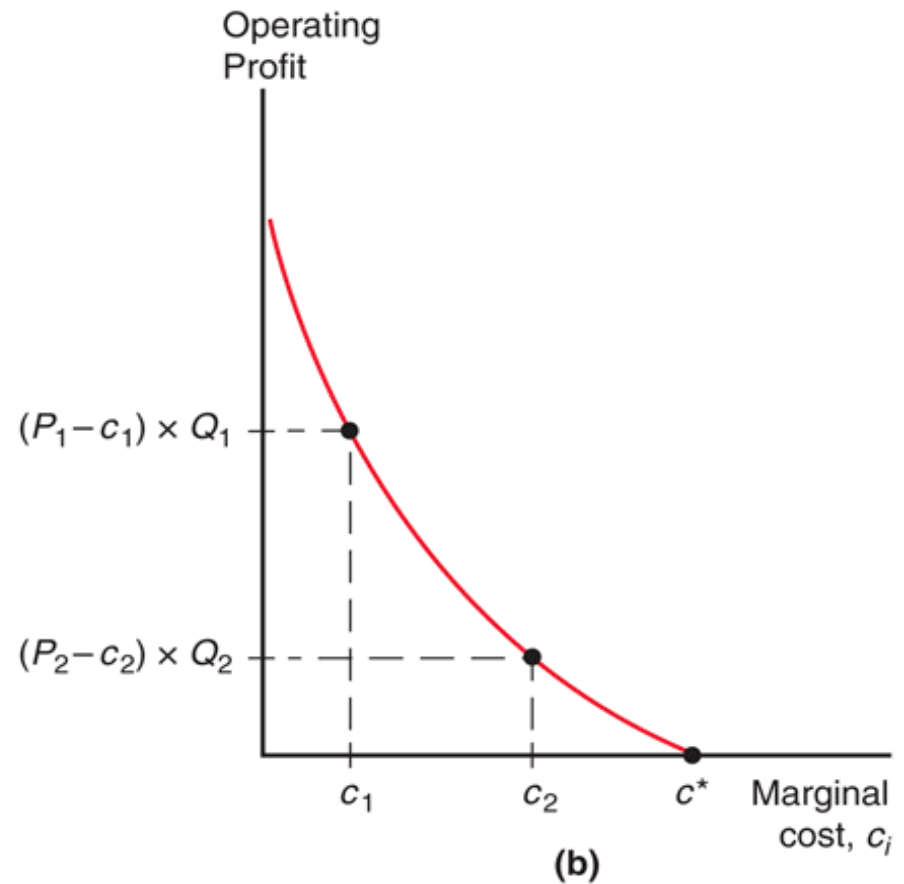
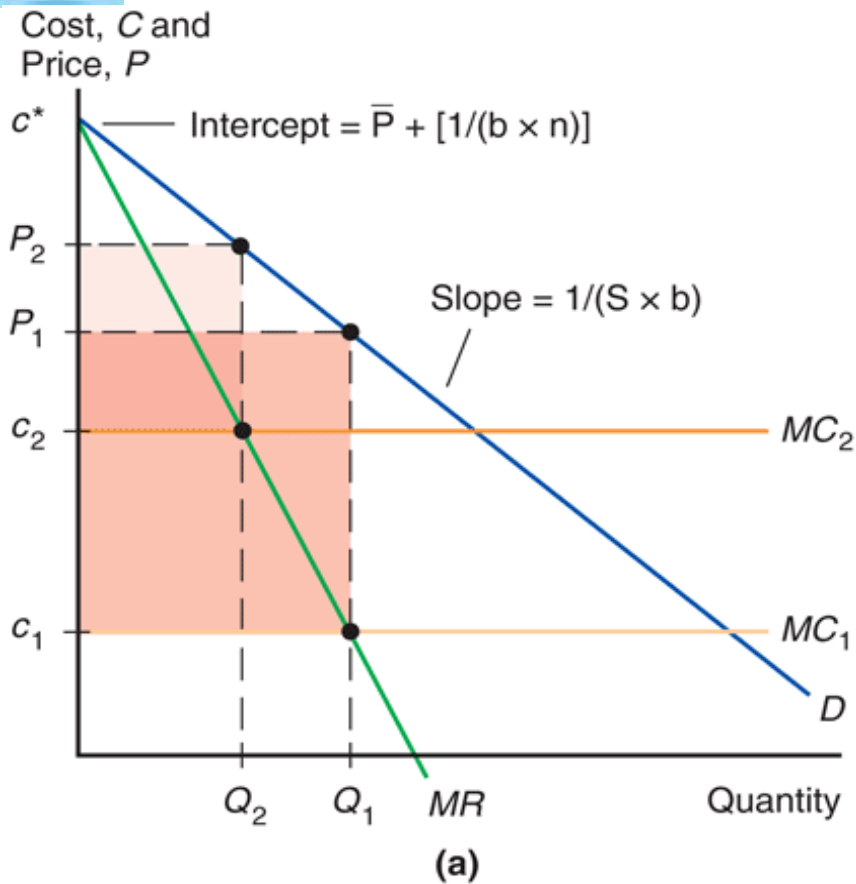
$$I = \frac{\min\{\text{exports}, \text{imports}\}}{(\text{exports} + \text{imports})/2}$$



Firm Responses to Trade

- Increased competition tends to hurt the worst-performing firms — they are forced to exit.
- The best-performing firms take the greatest advantage of new sales opportunities and expand the most.
- When the better-performing firms expand and the worse-performing ones contract or exit, overall industry performance improves.
 - Trade and economic integration improve industry performance as much as the discovery of a better technology does.

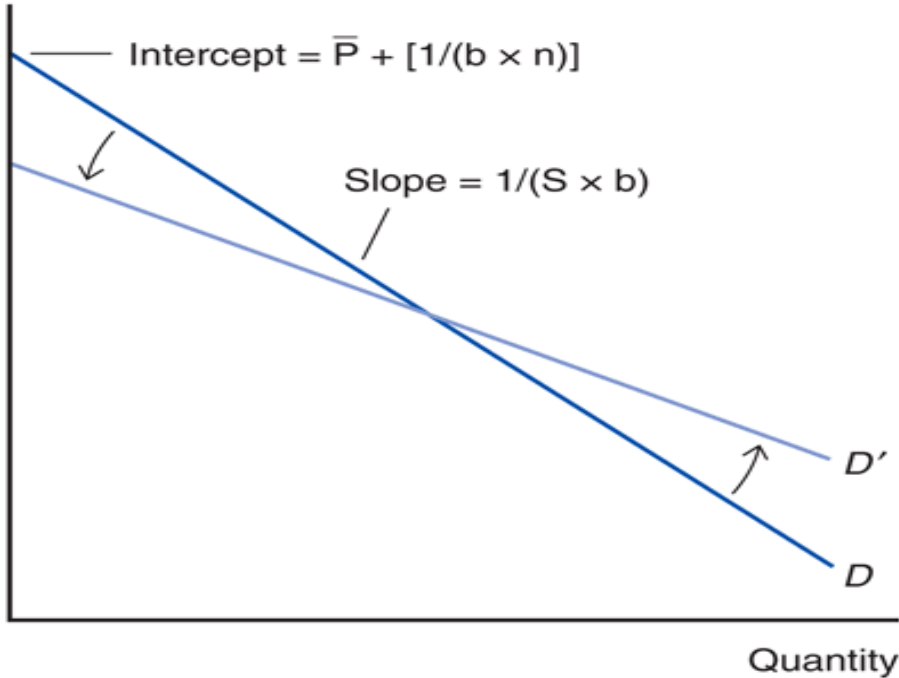
Fig. 8-6: Performance Differences Across Firms



Firms 1 and 2 face the same demand but they differ in marginal costs: $c_1 < c_2$. Firm 1 produces more, sets lower price, has higher mark-up over marginal cost, and has higher operating profit (shaded area).

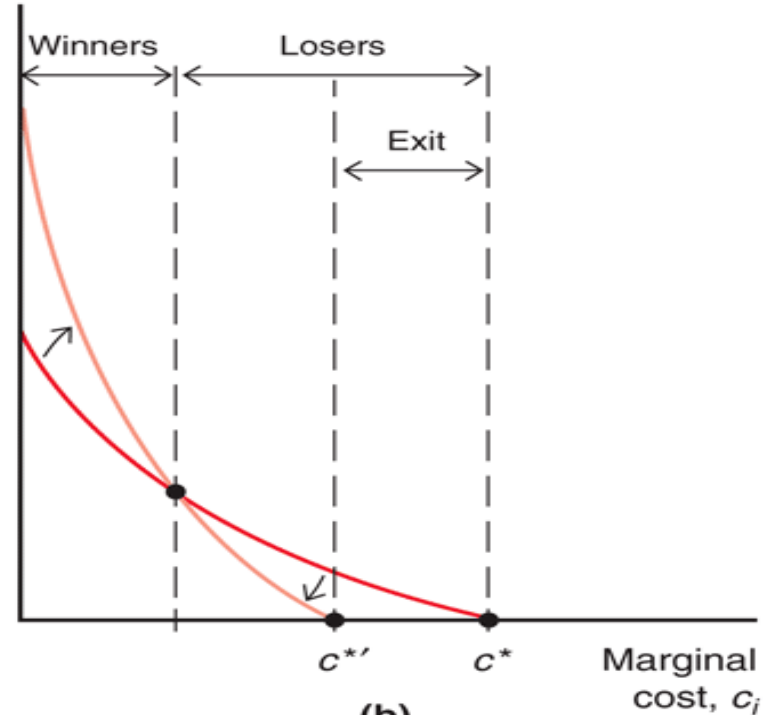
Fig. 8-7: Winners and Losers from Economic Integration

Cost, C and Price, P



(a)

Operating Profit



(b)

As a result of trade the demand curve is changing: it is flatter and has lower vertical intercept. Firms with the lowest marginal costs gain from integration and their profit increases. Firms with the highest marginal costs are forced to exit.



Trade Costs and Export Decisions

- Most U.S. firms do not report *any* exporting activity at all — sell only to U.S. customers.
 - In 2002, only 18% of U.S. manufacturing firms reported any sales abroad.
- Even in industries that export much of what they produce, such as chemicals, machinery, electronics, and transportation, fewer than 40 percent of firms export.
- A major reason why trade costs reduce trade so much is that they drastically reduce the number of firms selling to customers across the border.
 - Trade costs also reduce the volume of export sales of firms selling abroad.



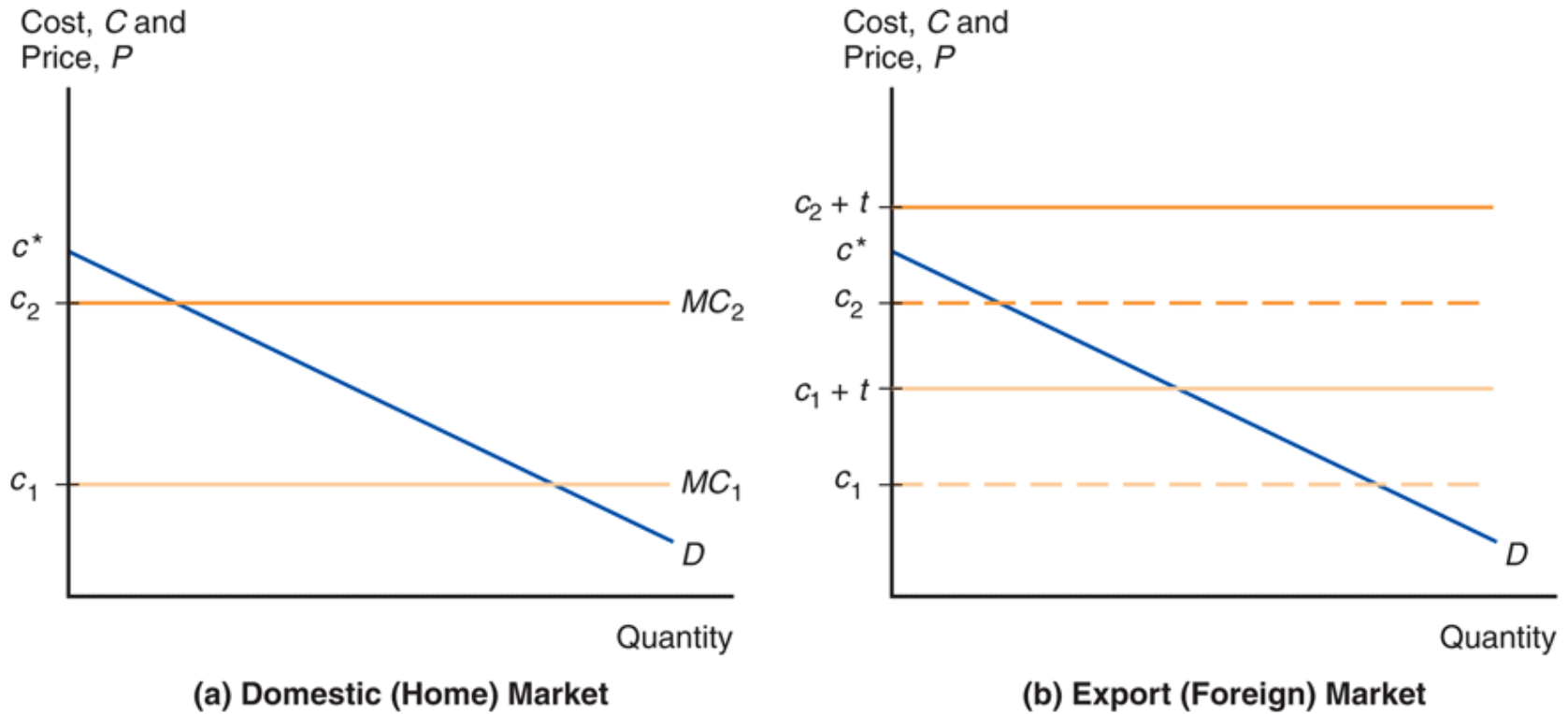
Table 8-3: Proportion of U.S. Firms Reporting Export Sales by Industry, 2002

Printing	5%
Furniture	7%
Apparel	8%
Wood Products	8%
Fabricated Metals	14%
Petroleum and Coal	18%
Transportation Equipment	28%
Machinery	33%
Chemicals	36%
Computer and Electronics	38%
Electrical Equipment and Appliances	38%

Source: A. B. Bernard, J. B. Jensen, S. J. Redding, and P. K. Schott, “Firms in International Trade.” *Journal of Economic Perspectives* 21 (Summer 2007), pp. 105–130.



Fig: 8-8: Export Decisions with Trade Costs



Firm 1 has lower marginal costs than firm 2. Both firms operate in their domestic market. With trade costs t dollars per unit of production, only firm 1 chooses to export to the foreign market.



Trade Costs and Export Decisions

- Trade costs added two important predictions to our model of monopolistic competition and trade:
 - Why only a subset of firms export, and why exporters are relatively larger and more productive (lower marginal costs).
- Overwhelming empirical support for this prediction that exporting firms are bigger and more productive than firms in the same industry that do not export.
 - In the United States, in a typical manufacturing industry, an exporting firm is on average more than twice as large as a firm that does not export.
 - Differences between exporters and nonexporters are even larger in many European countries.



Multinationals and FDI

- **Foreign direct investment** refers to investment in which a firm in one country *directly controls or owns* a subsidiary in another country.
- If a foreign company invests in at least 10% of the stock in a subsidiary, the two firms are typically classified as a **multinational corporation**.
 - 10% or more of ownership in stock is deemed to be sufficient for direct control of business operations.
- *Greenfield* FDI is when a company builds a new production facility abroad.
- *Brownfield* FDI (cross-border mergers and acquisitions) is when a domestic firm buys a controlling stake in a foreign firm.

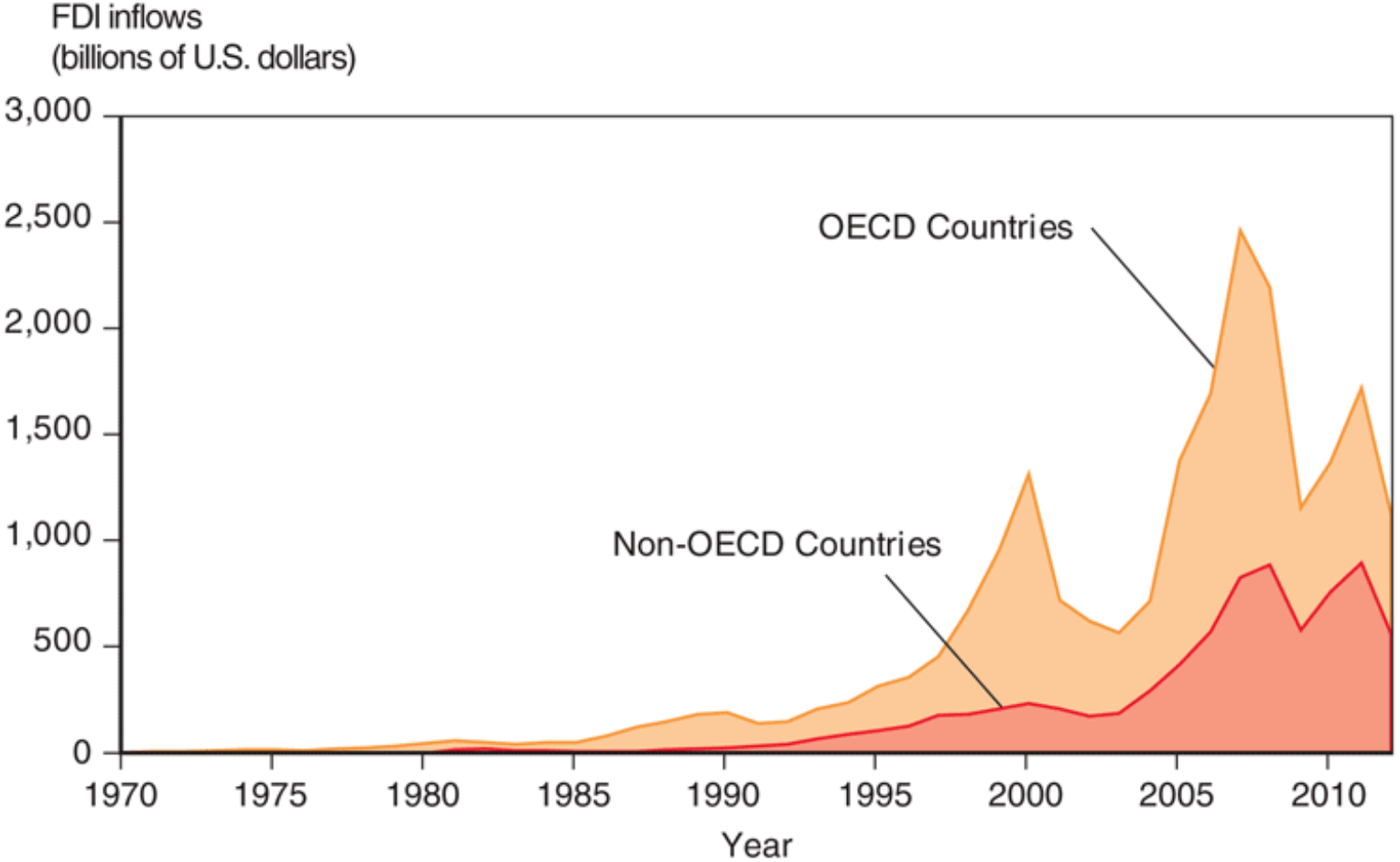


Foreign Direct Investment

- Greenfield FDI has tended to be more stable, while cross-border mergers and acquisitions tend to occur in surges.
- Developed countries have been the biggest recipients of inward FDI.
 - much more volatile than FDI going to developing and transition economies.
- Steady expansion in the share of FDI flowing to developing and transition countries.
 - Accounted for half of worldwide FDI flows since 2009.
- Multinationals tend to be much larger and more productive than other firms (even exporters) in the same country.



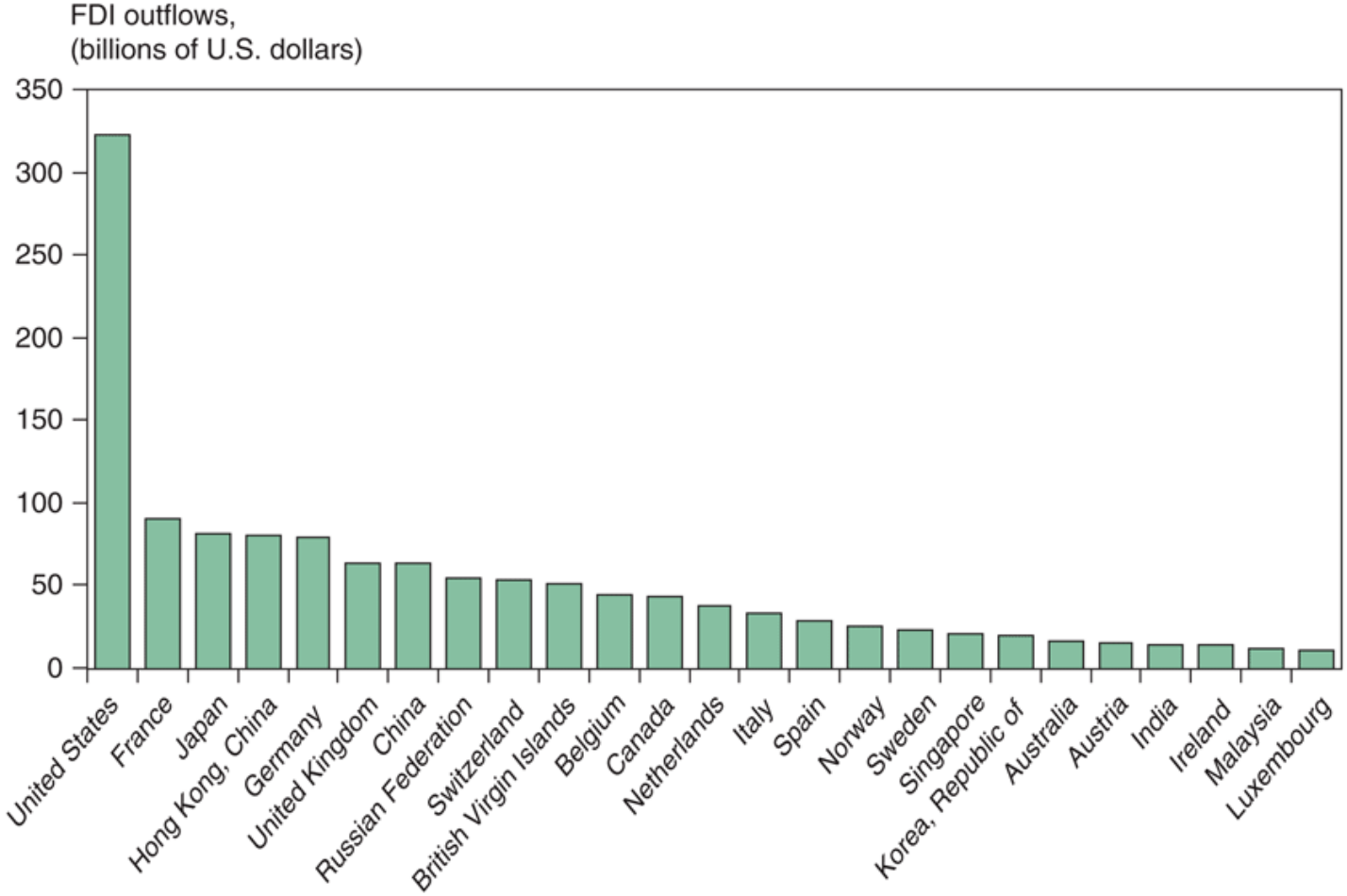
Fig. 8-9: Inflows of Foreign Direct Investment, 1970-2012



Source: World Bank, *World Development Indicators*.



Fig. 8-10: Outward Foreign Direct Investment for Top 25 Countries, 2009-2011



Source: UNCTAD, World Investment Report, 2012.



Foreign Direct Investment

- Two main types of FDI:
 - **Horizontal FDI** when the affiliate replicates the production process (that the parent firm undertakes in its domestic facilities) elsewhere in the world.
 - **Vertical FDI** when the production chain is broken up, and parts of the production processes are transferred to the affiliate location.



Foreign Direct Investment

- Vertical FDI is mainly driven by production cost differences between countries (for those parts of the production process that can be performed in another location).
 - Vertical FDI is growing fast and is behind the large increase in FDI inflows to developing countries.
- Horizontal FDI is dominated by flows between developed countries. Both the multinational parent and the affiliates are usually located in developed countries.
 - The main reason for this type of FDI is to locate production near a firm's large customer bases.
 - Hence, trade and transport costs play a much more important role than production cost differences for these FDI decisions.



The Firm's Decision Regarding Horizontal FDI

- *Proximity-concentration* trade-off:
 - High trade costs associated with exporting create an incentive to locate production near customers.
 - Increasing returns to scale in production create an incentive to concentrate production in fewer locations.
- Horizontal FDI activity are concentrated in sectors with high trade costs.
 - When increasing returns to scale are important and average plant sizes are large, we observe higher export volumes relative to FDI.



The Firm's Decision Regarding Horizontal FDI – formally

- The horizontal FDI decision involves a trade-off between
 - the per-unit export cost t and
 - the fixed cost F of setting up an additional production facility.
- If $t*Q > F$, it costs more to pay trade costs t on Q units sold abroad than to pay fixed cost F to build a plant abroad.
 - When foreign sales large $Q > F/t$, exporting is more expensive and FDI is the profit-maximizing choice.



The Firm's Decision Regarding Vertical FDI

- The vertical FDI decision also involves a trade-off between cost savings and the fixed cost F of setting up an additional production facility.
 - Cost savings related to comparative advantage make some stages of production cheaper in other countries.



Outsourcing as a Substitute for FDI

- Foreign **outsourcing** occurs when a firm contracts with an independent firm to produce in the foreign location.
- **Offshoring** represents the relocation of parts of the production chain abroad and groups together FDI and outsourcing.
- In addition to deciding the **location** of where to produce, firms also face an **internalization** decision: whether to keep production done by one firm or by separate firms.



Disadvantages of outsourcing and advantages of internalization

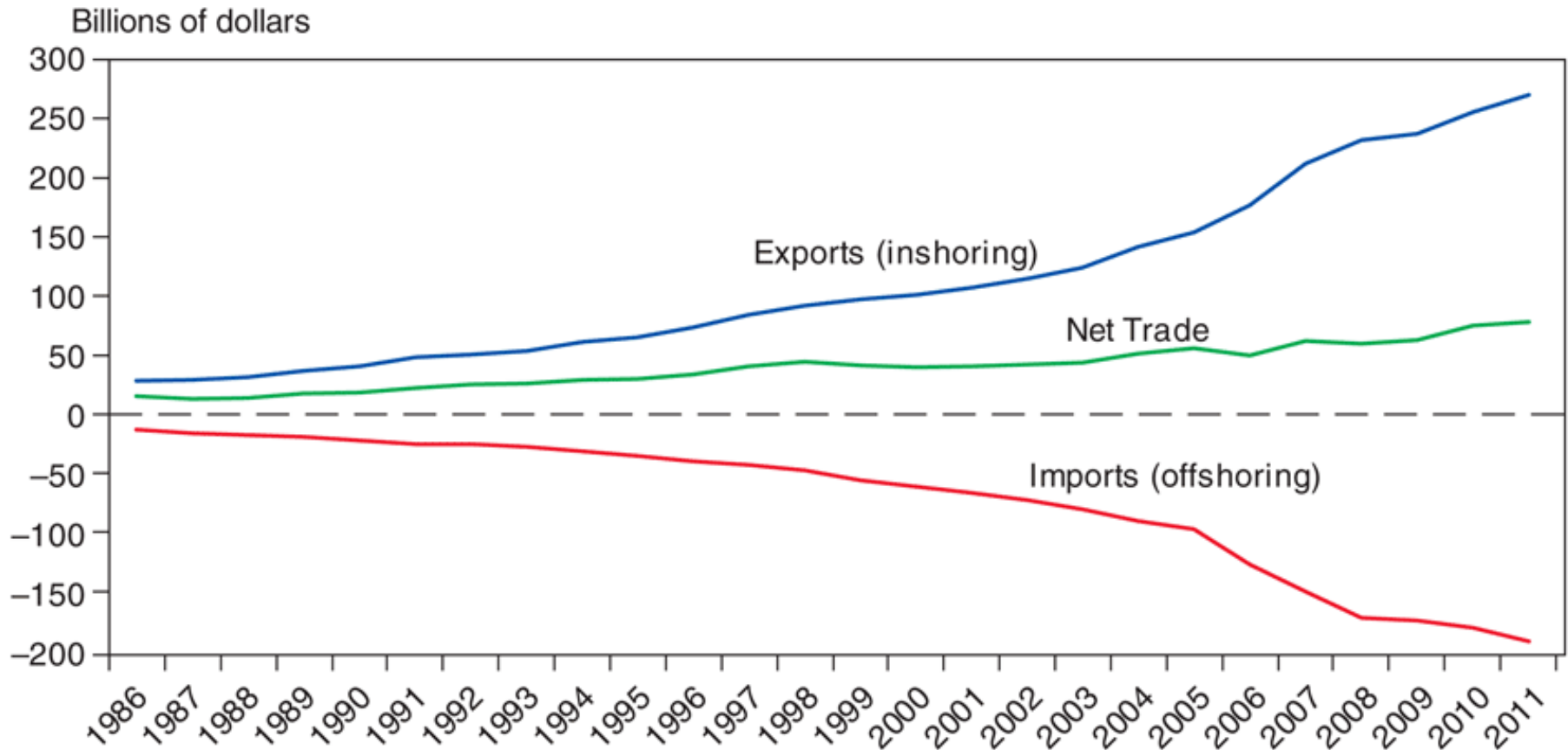
- Internalization occurs when it is more profitable to conduct transactions and production within a single organization.
- Reasons for this include:
 - 1. Technology transfers:** transfer of knowledge or another form of technology may be easier within a single organization than through a market transaction between separate organizations.
 - Patent or property rights may be weak or nonexistent.
 - Knowledge may not be easily packaged and sold.



Disadvantages of outsourcing and advantages of internalization

- 2. Vertical integration** involves consolidation of different stages of a production process.
- Internalization of production - a firm avoids potential conflict with the supplier of key components.
 - E.g. non-delivery, late delivery, worse quality, demanding higher price
 - But an independent supplier could benefit from economies of scale if it performs the process for many parent firms.

Fig. 8-11: U.S. International Trade in Business Services, 1986–2011



Source: U.S. Bureau of Economic Analysis.



Multinationals, FDI, and Outsourcing

- Foreign direct investment should benefit the countries involved for reasons similar to why international trade generates gains.
 - Multinationals and firms that outsource take advantage of cost differentials that favor moving production (or parts thereof) to particular locations.
 - FDI is very similar to the relocation of production that occurred *across* sectors when opening to trade.
 - There are similar welfare consequences for the case of multinationals and outsourcing: Relocating production to take advantage of cost differences leads to overall gains from trade.
 - Empirics: firms, which through FDI or outsourcing import components, also mostly export final goods. USA in 2000: 92% of firms which import components also export final goods.



Summary

1. Internal economies of scale imply that more production at the firm level causes average costs to fall.
2. With monopolistic competition, each firm can raise prices somewhat above those on competing products due to product differentiation but must compete with other firms whose prices are believed to be unaffected by each firm's actions.
3. Monopolistic competition allows for gains from trade through lower costs and prices, as well as through wider consumer choice.



Summary

4. Monopolistic competition predicts intra-industry trade.
5. Economic integration creates winners and losers. The better performing firms expand while the worse performing firms contract or leave the market.
6. When there are trade costs, only a subset of more productive firms export, the remaining firms serve only their domestic markets.



Summary

7. Multinationals are typically larger and more productive than exporters, which in turn are larger and more efficient than firms that sell only to the domestic market.
8. Multinational corporations undertake foreign direct investment when proximity is more important than concentrating production in one location.
 - Firms produce where it is most cost-effective — abroad if the scale is large enough. They replicate entire production process abroad or locate stages in different countries.
 - Firms also decide whether to keep transactions within the firm or contract with another firm.