

Introduction



- Countries engage in international trade for two basic reasons:
 - Countries trade because they differ either in their resources or in technology.
 - Countries trade in order to achieve scale economies or increasing returns in production.
- Two models of international trade in which economies of scale and imperfect competition play a crucial role:
 - Monopolistic competition model
 - Dumping model

Economies of Scale and International Trade: An Overview



- Models of trade based on comparative advantage (e.g. Ricardian model) used the assumptions of constant returns to scale and perfect competition:
 - Increasing the amount of all inputs used in the production of any commodity will increase output of that commodity in the same proportion.
- In practice, many industries are characterized by economies of scale (also referred to as increasing returns).
 - Production is most efficient, the larger the scale at which it takes place.

Economies of Scale and International Trade: An Overview



- Under increasing returns to scale:
 - Output grows proportionately more than the increase in all inputs.
 - Average costs (costs per unit) decline with the size of the market.

Economies of Scale and International Trade: An Overview



Table 6-1: 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

Economies of Scale and Market Structure



- **Economies of scale** can be either:
 - **External**
 - The cost per unit depends on the size of the industry but not necessarily on the size of any one firm.
 - An industry will typically consist of many small firms and be perfectly competitive.
 - **Internal**
 - The cost per unit depends on the size of an individual firm but not necessarily on that of the industry.
 - The market structure will be imperfectly competitive with large firms having a cost advantage over small.
 - Both types of scale economies are important causes of international trade.

The Theory of Imperfect Competition



■ Imperfect competition

- Firms are aware that they can influence the price of their product.
 - They know that they can sell more only by reducing their price.
- Each firm views itself as a price setter, choosing the price of its product, rather than a price taker.
- The simplest imperfectly competitive market structure is that of a **pure monopoly**, a market in which a firm faces no competition.

The Theory of Imperfect Competition



■ Monopoly: A Brief Review

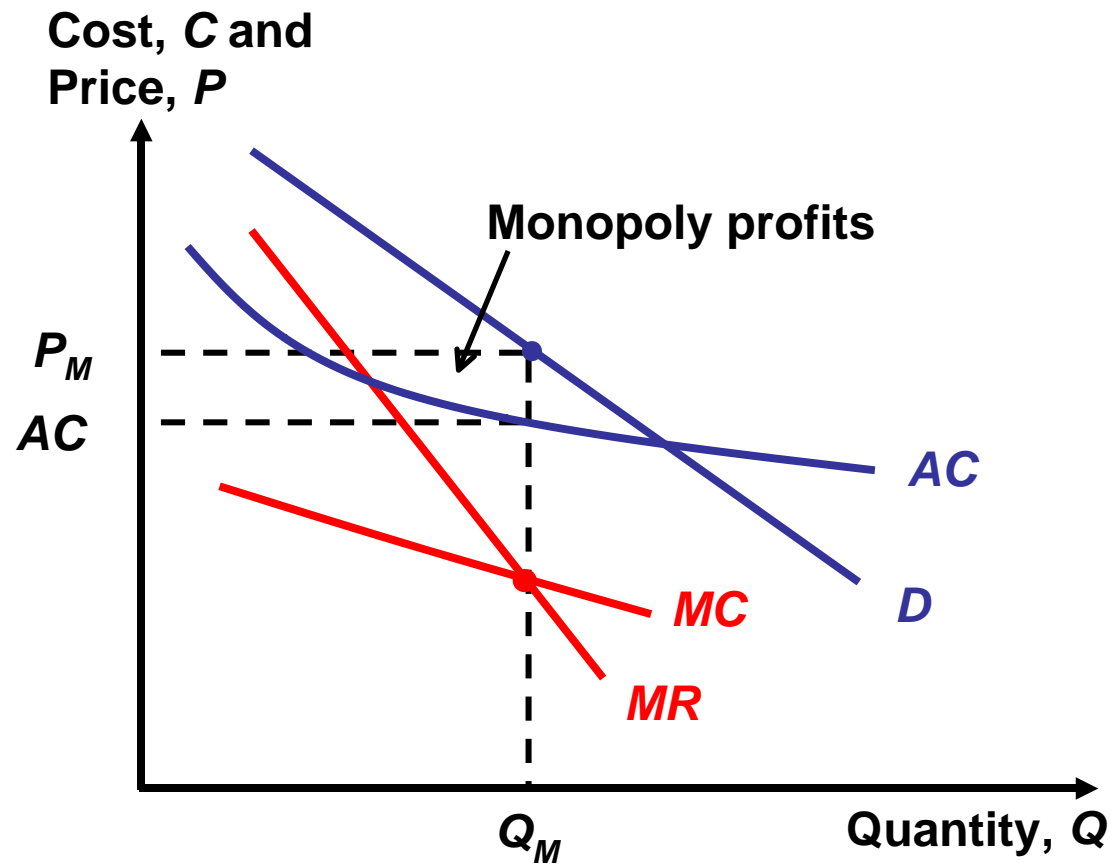
• Marginal revenue

- The extra revenue the firm gains from selling an additional unit
- Its curve, MR , always lies below the demand curve, D .
 - In order to sell an additional unit of output the firm must lower the price of all units sold (not just the marginal one).

The Theory of Imperfect Competition



Figure 6-1: Monopolistic Pricing and Production Decisions



The Theory of Imperfect Competition



- **Marginal Revenue and Price**
 - Marginal revenue is always less than the price.
 - The relationship between marginal revenue and price depends on two things:
 - How much output the firm is already selling
 - The slope of the demand curve
 - » It tells us how much the monopolist has to cut his price to sell one more unit of output.

The Theory of Imperfect Competition



- Assume that the demand curve the firm faces is a straight line:

$$Q = A - B \times P \quad (6-1)$$

- Then the *MR* that the firm faces is given by:

$$MR = P - Q/B \quad (6-2)$$

- **Average and Marginal Costs**

- **Average Cost (AC)** is total cost divided by output.
- **Marginal Cost (MC)** is the amount it costs the firm to produce one extra unit.

The Theory of Imperfect Competition



- When average costs decline in output, marginal cost is always less than average cost.
- Suppose the costs of a firm, C , take the form:

$$C = F + c \times Q \quad (6-3)$$

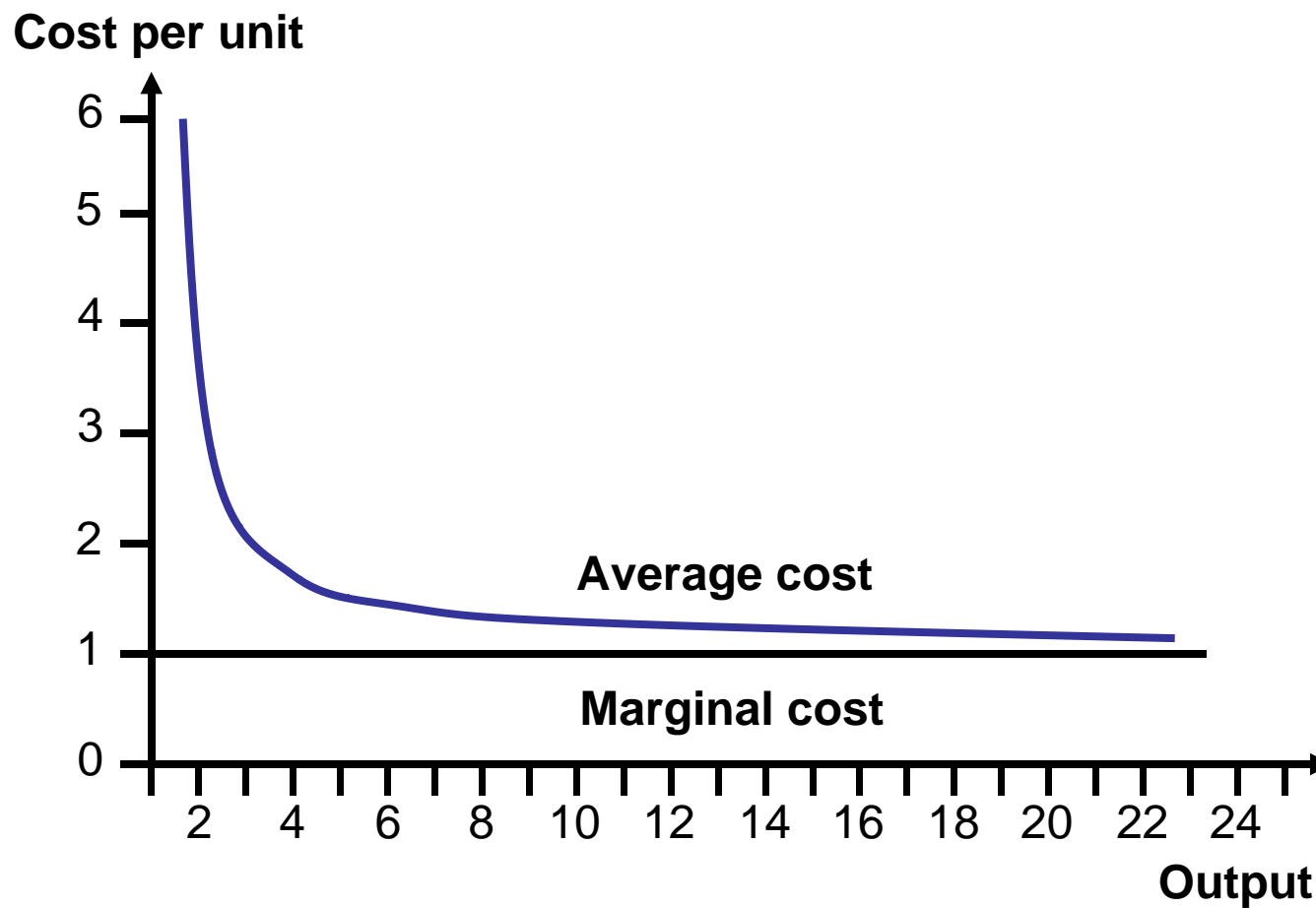
- This is a linear cost function.
- The fixed cost in a linear cost function gives rise to economies of scale, because the larger the firm's output, the less is fixed cost per unit.
- The firm's average costs is given by:

$$AC = C/Q = F/Q + c \quad (6-4)$$

The Theory of Imperfect Competition



Figure 6-2: Average Versus Marginal Cost



The Theory of Imperfect Competition



■ Monopolistic Competition

• Oligopoly

- Internal economies generate an oligopoly market structure.
 - There are several firms, each of which is large enough to affect prices, but none with an uncontested monopoly.
- Strategic interactions among oligopolists have become important.
 - Each firm decides its own actions, taking into account how that decision might influence its rival's actions.

The Theory of Imperfect Competition



- **Monopolistic competition**
 - A special case of oligopoly
 - Two key assumptions are made to get around the problem of interdependence:
 - Each firm is assumed to be able to differentiate its product from its rivals.
 - Each firm is assumed to take the prices charged by its rivals as given.

The Theory of Imperfect Competition



- Are there any monopolistically competitive industries in the real world?
 - Some industries may be reasonable approximations (e.g., the automobile industry in Europe)
 - The main appeal of the monopolistic competition model is not its realism, but its simplicity.

The Theory of Imperfect Competition



- **Assumptions of the Model**
 - Imagine an industry consisting of a number of firms producing differentiated products.
 - We expect a firm:
 - To sell more the larger the total demand for its industry's product and the higher the prices charged by its rivals
 - To sell less the greater the number of firms in the industry and the higher its own price

The Theory of Imperfect Competition



- A particular equation for the demand facing a firm that has these properties is:

$$Q = S \times [1/n - b \times (P - \bar{P})] \quad (6-5)$$

where:

- Q is the 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

The Theory of Imperfect Competition



- **Market Equilibrium**

- All firms in this industry are symmetric
 - The demand function and cost function are identical for all firms.
- The method for determining the number of firms and the average price charged involves three steps:
 - We derive a relationship between the number of firms and the average cost of a typical firm.
 - We derive a relationship between the number of firms and the price each firm charges.
 - We derive the equilibrium number of firms and the average price that firms charge.

The Theory of Imperfect Competition



- **The number of firms and average cost**

- How do the average costs depend on the number of firms in the industry?
- Under symmetry, $P = \bar{P}$, equation (6-5) tells us that $Q = S/n$ but equation (6-4) shows us that the average cost depends inversely on a firm's output.
- We conclude that average cost depends on the size of the market and the number of firms in the industry:

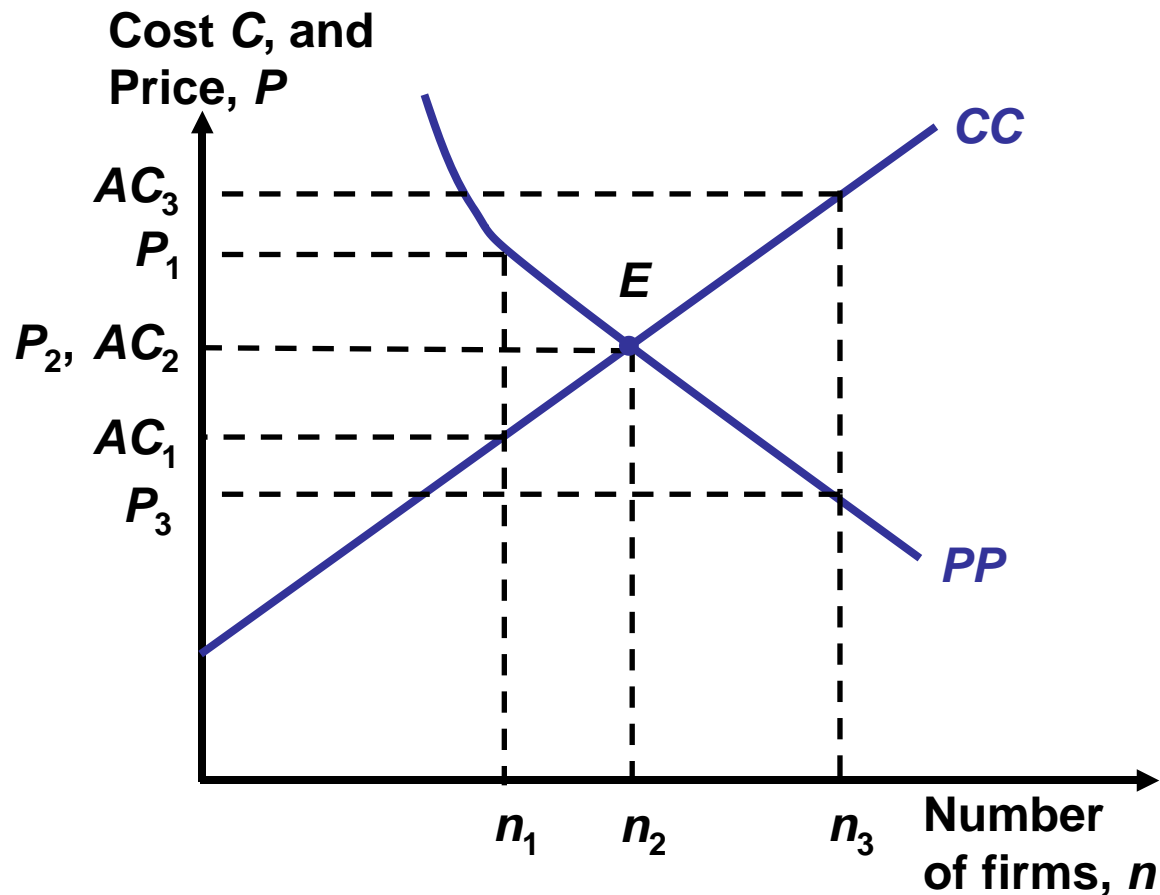
$$AC = F/Q + c = n \times F/S + c \quad (6-6)$$

- The more firms there are in the industry the higher is the average cost.

The Theory of Imperfect Competition



Figure 6-3: Equilibrium in a Monopolistically Competitive Market



The Theory of Imperfect Competition



- **The number of firms and the price**

- The price the typical firm charges depends on the number of firms in the industry.
 - The more firms, the more competition, and hence the lower the price.
- In the monopolistic competition model firms are assumed to take each others' prices as given.
- If each firm treats P as given, we can rewrite the demand curve (6-5) in the form:

$$Q = (S/n + S \times b \times \bar{P}) - S \times b \times P \quad (6-7)$$

The Theory of Imperfect Competition



- Profit-maximizing firms set marginal revenue equal to their marginal cost, c .
- This generates a negative relationship between the price and the number of firms in the market which is the PP curve:

$$P = c + 1/(b \times n) \quad (6-10)$$

- The more firms there are in the industry, the lower the price each firm will charge.

The Theory of Imperfect Competition



- **The equilibrium number of firms**
 - The downward-sloping curve PP shows that the more firms, the lower the price each firm will charge.
 - The more firms, the more competition each firm faces.
 - The upward-sloping curve CC tells us that the more firms there are, the higher the average cost of each firm.
 - If the number of firms increases, each firm will sell less, so firms will not be able to move as far down their average cost curve.

The Theory of Imperfect Competition



- **Limitations of the Monopolistic Competition Model**
 - Two kinds of behavior arise in the general oligopoly setting that are excluded by assumption from the monopolistic competition model:
 - Collusive behavior:
 - Can raise the profits of all firms at the expense of consumers
 - May be managed through explicit agreements or through tacit coordination strategies
 - Strategic behavior:
 - Is adopted by firms to affect the behavior of competitors in a desirable way
 - Deters potential rivals from entering an industry

Monopolistic Competition and Trade



- The monopolistic competition model can be used to show how trade leads to:
 - A lower average price due to scale economies
 - The availability of a greater variety of goods due to product differentiation
 - Imports and exports within each industry (intra-industry trade)

Monopolistic Competition and Trade

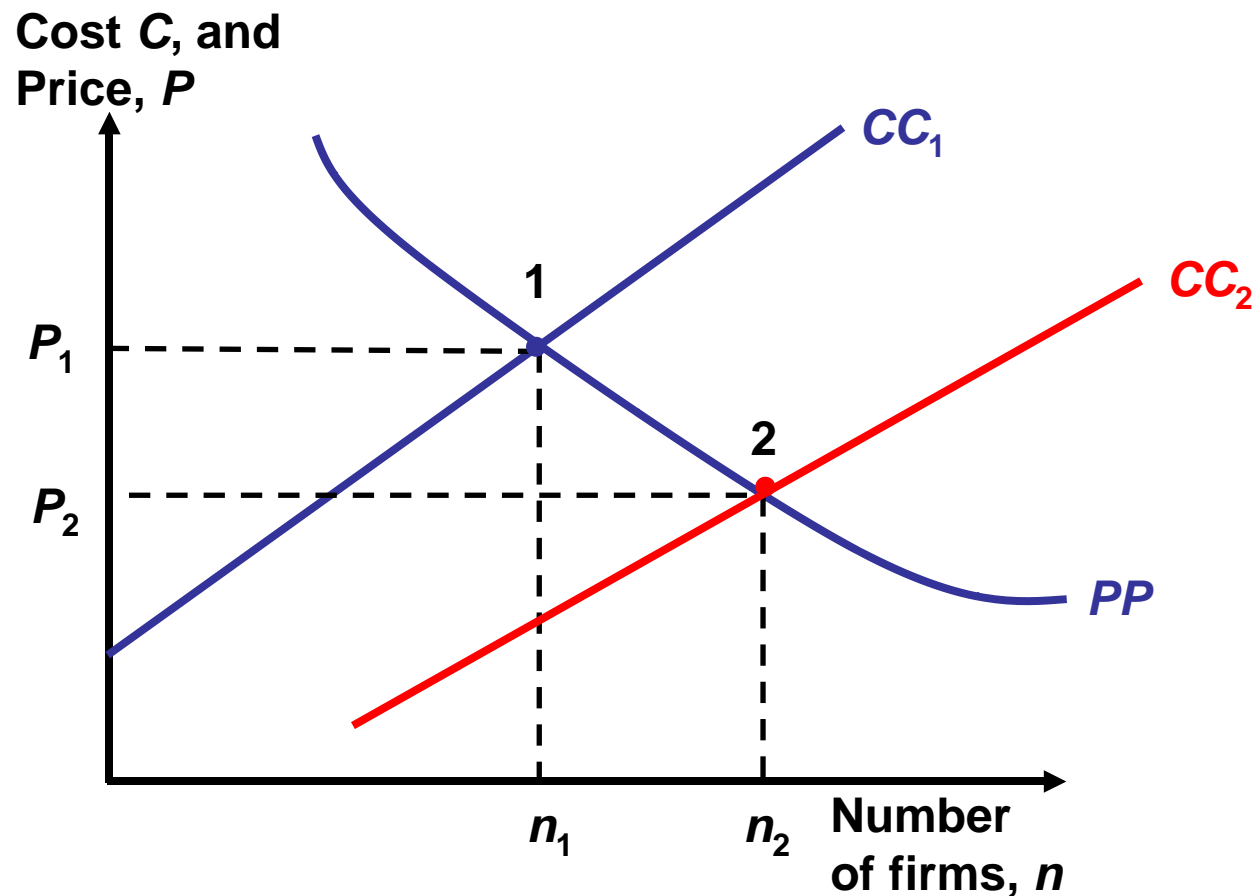


- **The Effects of Increased Market Size**
 - The number of firms in a monopolistically competitive industry and the prices they charge are affected by the size of the market.

Monopolistic Competition and Trade



Figure 6-4: Effects of a Larger Market



Monopolistic Competition and Trade



- Gains from an Integrated Market: A Numerical Example
 - International trade allows creation of an integrated market that is larger than each country's market.
 - It thus becomes possible to offer consumers a greater variety of products and lower prices.

Monopolistic Competition and Trade

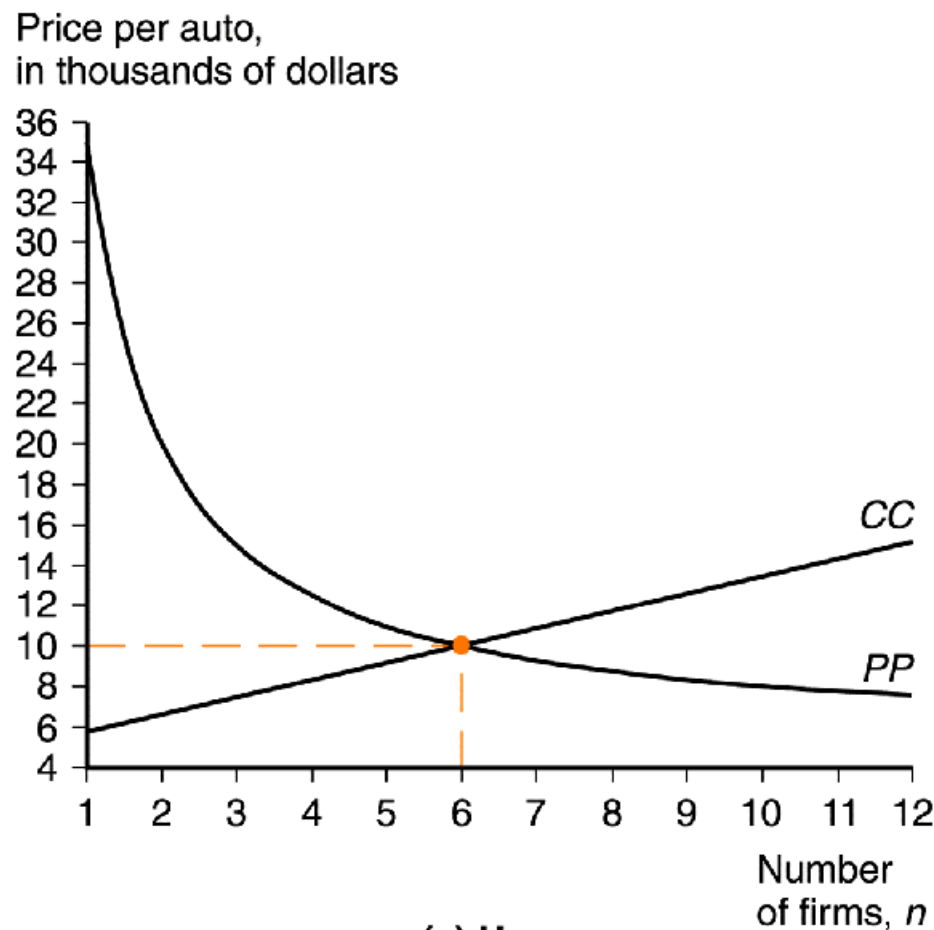


- Example: Suppose that automobiles are produced by a monopolistically competitive industry.
 - Assume the following:
 - $b = 1/30,000$
 - $F = \$750,000,000$
 - $c = \$5000$
 - There are two countries (Home and Foreign) that have the same costs of automobile production.
 - Annual sales of automobiles are 900,000 at Home and 1.6 million at Foreign.

Monopolistic Competition and Trade



Figure 6-5: Equilibrium in the Automobile Market

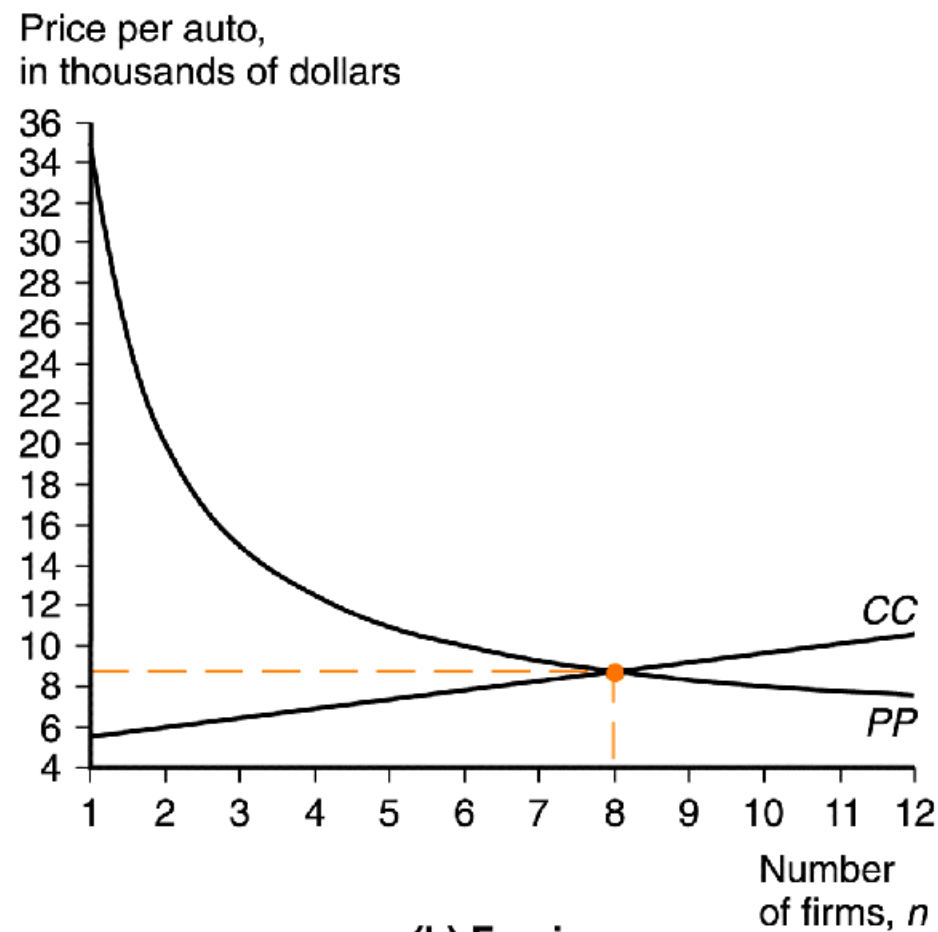


(a) Home

Monopolistic Competition and Trade



Figure 6-5: Continued



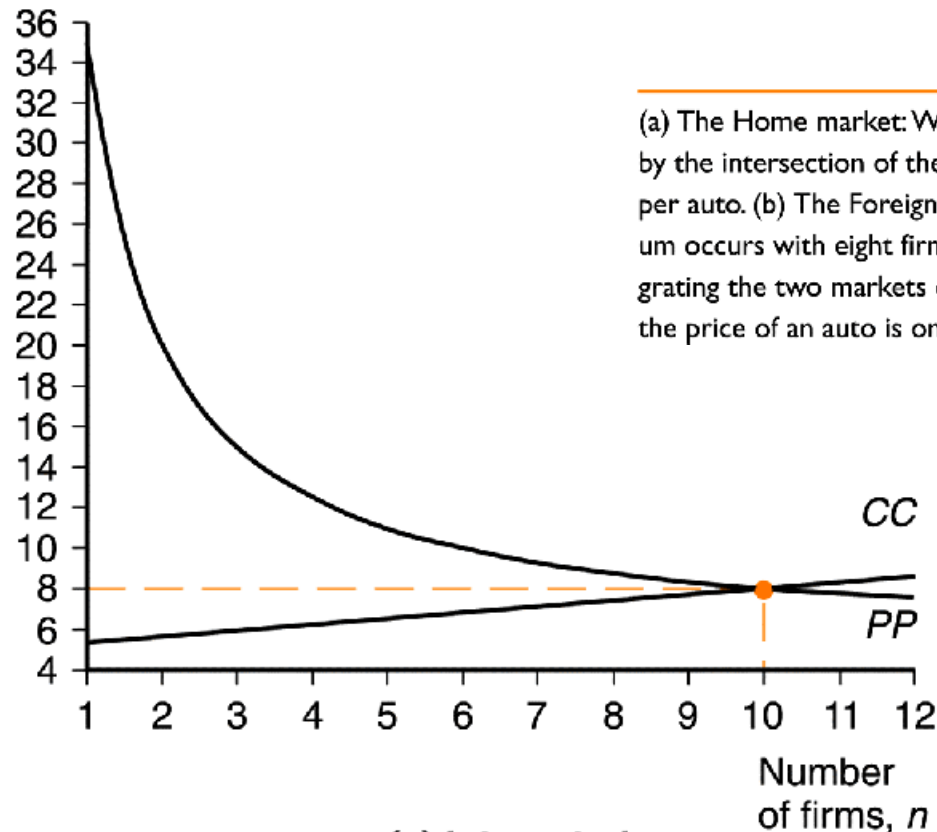
(b) Foreign

Monopolistic Competition and Trade



Figure 6-5: Continued

Price per auto,
in thousands of dollars



(a) The Home market: With a market size of 900,000 automobiles, Home's equilibrium, determined by the intersection of the *PP* and *CC* curves, occurs with six firms and an industry price of \$10,000 per auto. (b) The Foreign market: With a market size of 1.6 million automobiles, Foreign's equilibrium occurs with eight firms and an industry price of \$8750 per car. (c) The combined market: Integrating the two markets creates a market for 2.5 million autos. This market supports ten firms, and the price of an auto is only \$8000.

(c) Integrated

Monopolistic Competition and Trade



Table 6-2: Hypothetical Example of Gains from Market Integration

	Home Market, before Trade	Foreign Market, before Trade	Integrated Market, after Trade
Total sales of autos	900,000	1,600,000	2,500,000
Number of firms	6	8	10
Sales per firm	150,000	200,000	250,000
Average cost	10,000	8,750	8,000
Price	10,000	8,750	8,000

Monopolistic Competition and Trade

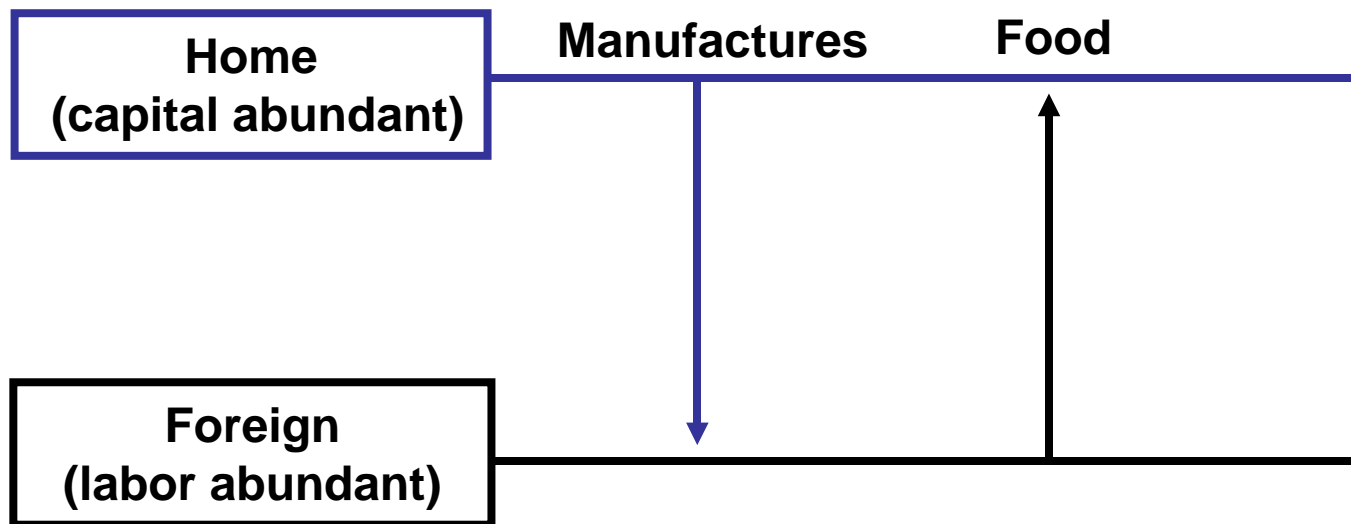


- **Economies of Scale and Comparative Advantage**
 - **Assumptions:**
 - There are two countries: Home (the capital-abundant country) and Foreign.
 - There are two industries: manufactures (the capital-intensive industry) and food.
 - Neither country is able to produce the full range of manufactured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

Monopolistic Competition and Trade



Figure 6-6: Trade in a World Without Increasing Returns



Monopolistic Competition and Trade

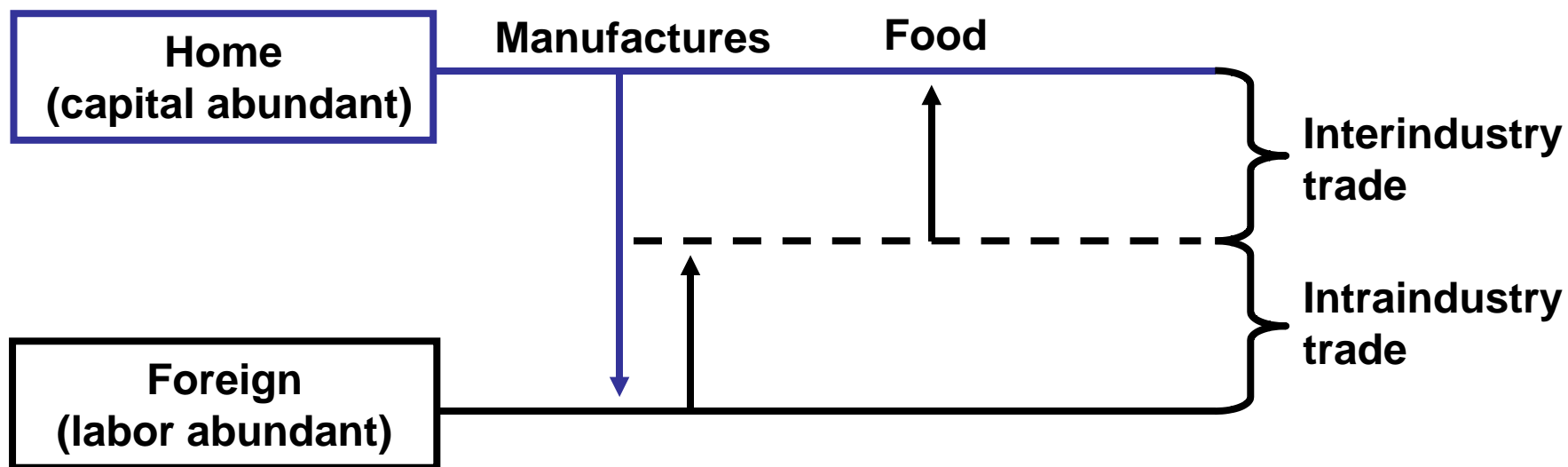


- If manufactures is a monopolistically competitive sector, world trade consists of two parts:
 - **Intraindustry trade**
 - The exchange of manufactures for manufactures
 - **Interindustry trade**
 - The exchange of manufactures for food

Monopolistic Competition and Trade



Figure 6-7: Trade with Increasing Returns and Monopolistic Competition



Monopolistic Competition and 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.

Monopolistic Competition and Trade



- **The Significance of Intraindustry Trade**
 - About one-fourth of world trade consists of intra-industry trade.
 - Intra-industry trade plays a particularly large role in the trade in manufactured goods among advanced industrial nations, which accounts for most of world trade.

Monopolistic Competition and Trade



Table 6-3: Indexes of Intraindustry Trade for U.S. Industries, 1993

Inorganic chemicals	0.99
Power-generating machinery	0.97
Electrical machinery	0.96
Organic chemicals	0.91
Medical and pharmaceutical	0.86
Office machinery	0.81
Telecommunications equipment	0.69
Road vehicles	0.65
Iron and steel	0.43
Clothing and apparel	0.27
Footwear	0.00

Monopolistic Competition and Trade



■ Why Intraindustry Trade Matters

- Intraindustry trade allows countries to benefit from larger markets.
 - The case study of the North American Auto Pact of 1964 indicates that the gains from creating an integrated industry in two countries can be substantial.
- Gains from intraindustry trade will be large when economies of scale are strong and products are highly differentiated.
 - For example, sophisticated manufactured goods.

Dumping



■ The Economics of Dumping

● Price discrimination

- The practice of charging different customers different prices

● Dumping

- The most common form of price discrimination in international trade
- A pricing practice in which a firm charges a lower price for an exported good than it does for the same good sold domestically

Dumping

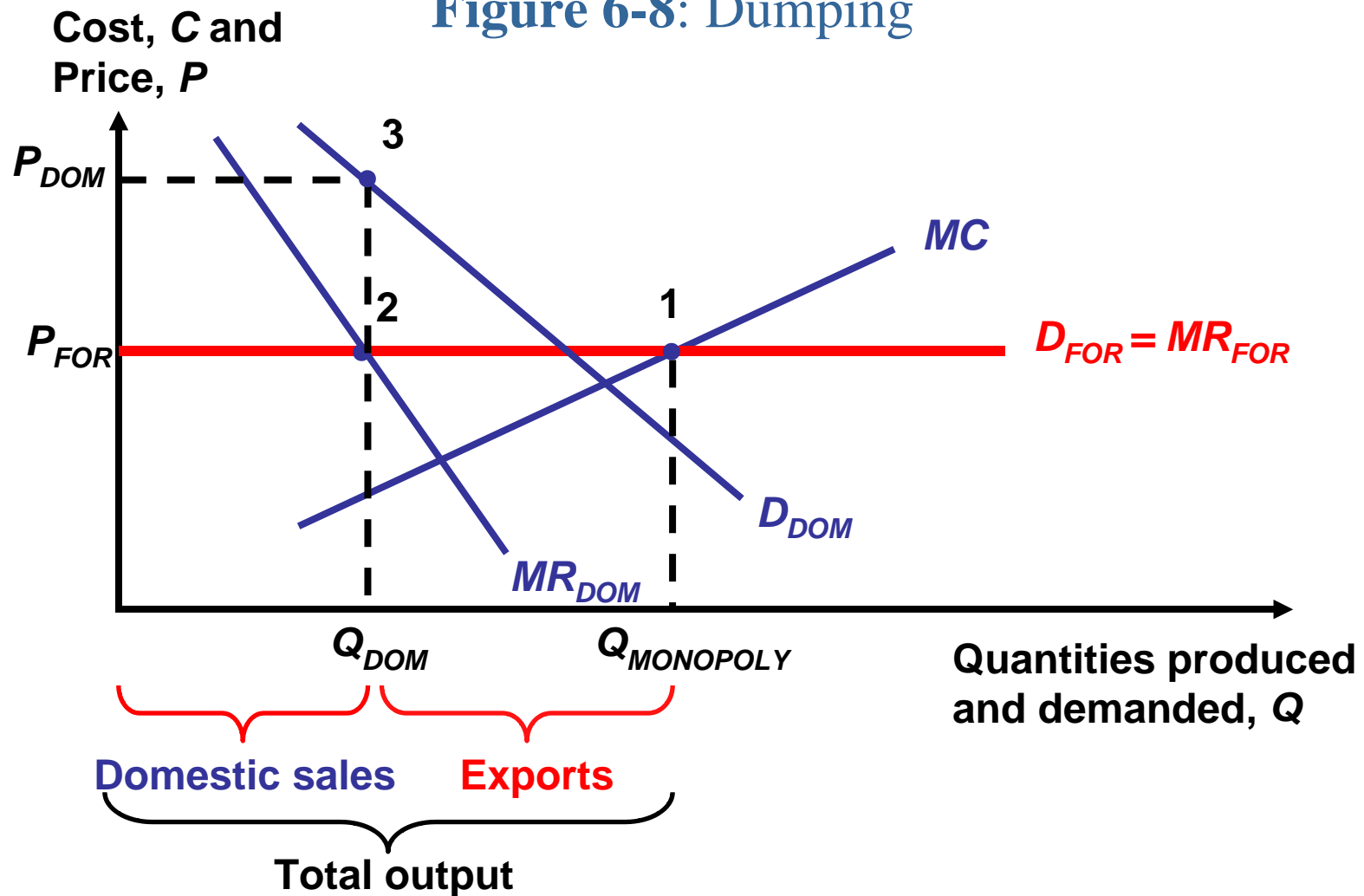


- It is a controversial issue in trade policy and is widely regarded as an unfair practice in international trade.
 - Example: As of April 2002, the United States had anti-dumping duties on 265 items from 40 different countries.
- Dumping can occur only if two conditions are met:
 - Imperfectly competitive industry
 - Segmented markets
- Given these conditions, a monopolistic firm may find that it is profitable to engage in dumping.



Dumping

Figure 6-8: Dumping



Dumping



■ Reciprocal Dumping

- A situation in which dumping leads to two-way trade in the same product
- It increases the volume of trade in goods that are not quite identical.
- Its net welfare effect is ambiguous:
 - It wastes resources in transportation.
 - It creates some competition.

The Theory of External Economies



- Economies of scale that occur at the level of the industry instead of the firm are called external economies.
- There are three main reasons why a cluster of firms may be more efficient than an individual firm in isolation:
 - **Specialized suppliers**
 - **Labor market pooling**
 - **Knowledge spillovers**

The Theory of External Economies



■ Specialized Suppliers

- In many industries, the production of goods and services and the development of new products requires the use of specialized equipment or support services.
- An individual company does not provide a large enough market for these services to keep the suppliers in business.
 - A localized industrial cluster can solve this problem by bringing together many firms that provide a large enough market to support specialized suppliers.
 - This phenomenon has been extensively documented in the semiconductor industry located in Silicon Valley.

The Theory of External Economies



■ Labor Market Pooling

- A cluster of firms can create a pooled market for workers with highly specialized skills.
- It is an advantage for:
 - Producers
 - They are less likely to suffer from labor shortages.
 - Workers
 - They are less likely to become unemployed.

The Theory of External Economies



■ Knowledge Spillovers

- Knowledge is one of the important input factors in highly innovative industries.
- The specialized knowledge that is crucial to success in innovative industries comes from:
 - Research and development efforts
 - Reverse engineering
 - Informal exchange of information and ideas

The Theory of External Economies



- **External Economies and Increasing Returns**
 - External economies can give rise to increasing returns to scale at the level of the national industry.
 - **Forward-falling supply curve**
 - The larger the industry's output, the lower the price at which firms are willing to sell their output.

External Economies and International Trade

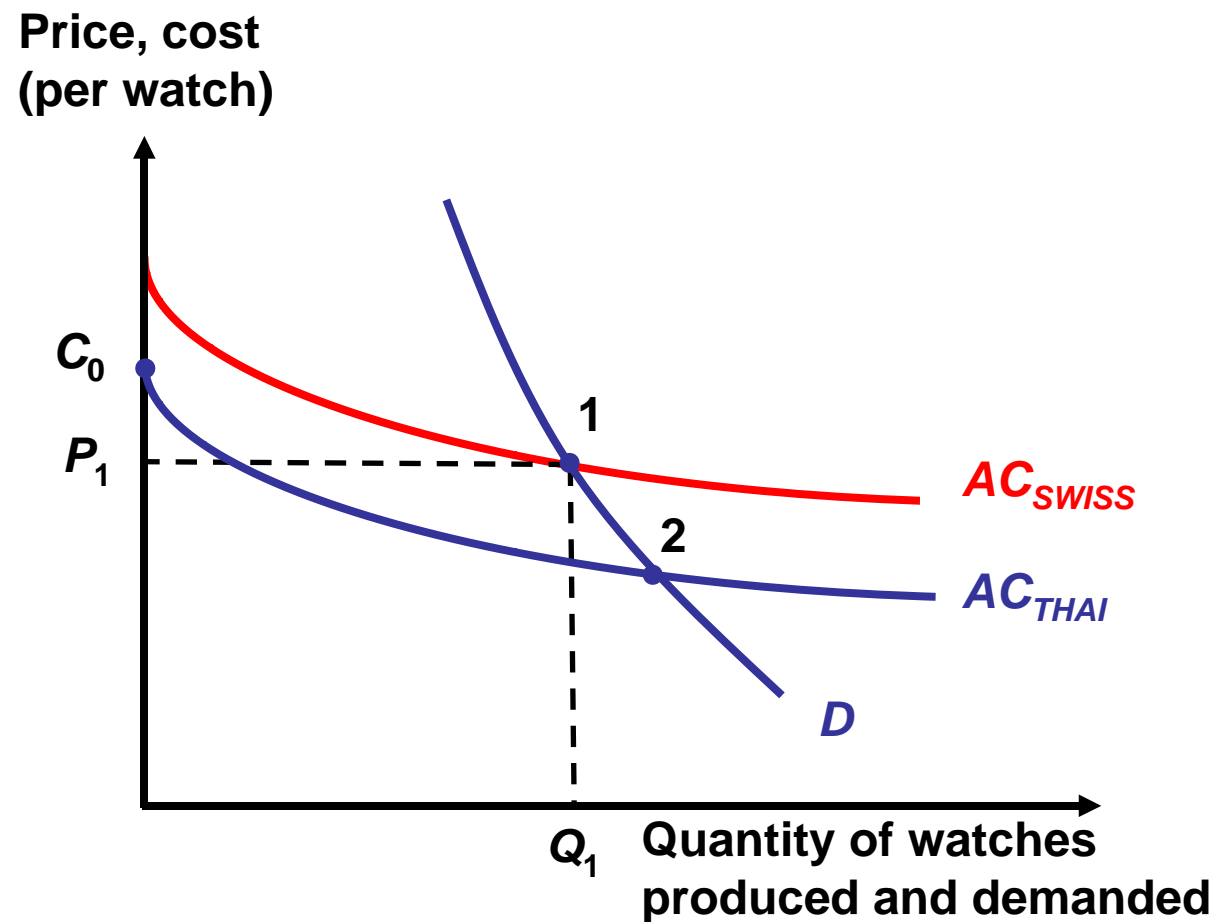


- **External Economies and the Patter of Trade**
 - A country that has large production in some industry will tend to have low costs of producing that good.
 - Countries that start out as large producers in certain industries tend to remain large producers even if some other country could potentially produce the goods more cheaply.
 - Figure 6-9 illustrates a case where a pattern of specialization established by historical accident is persistent.

External Economies and International Trade



Figure 6-9: External Economies and Specialization



External Economies and International Trade

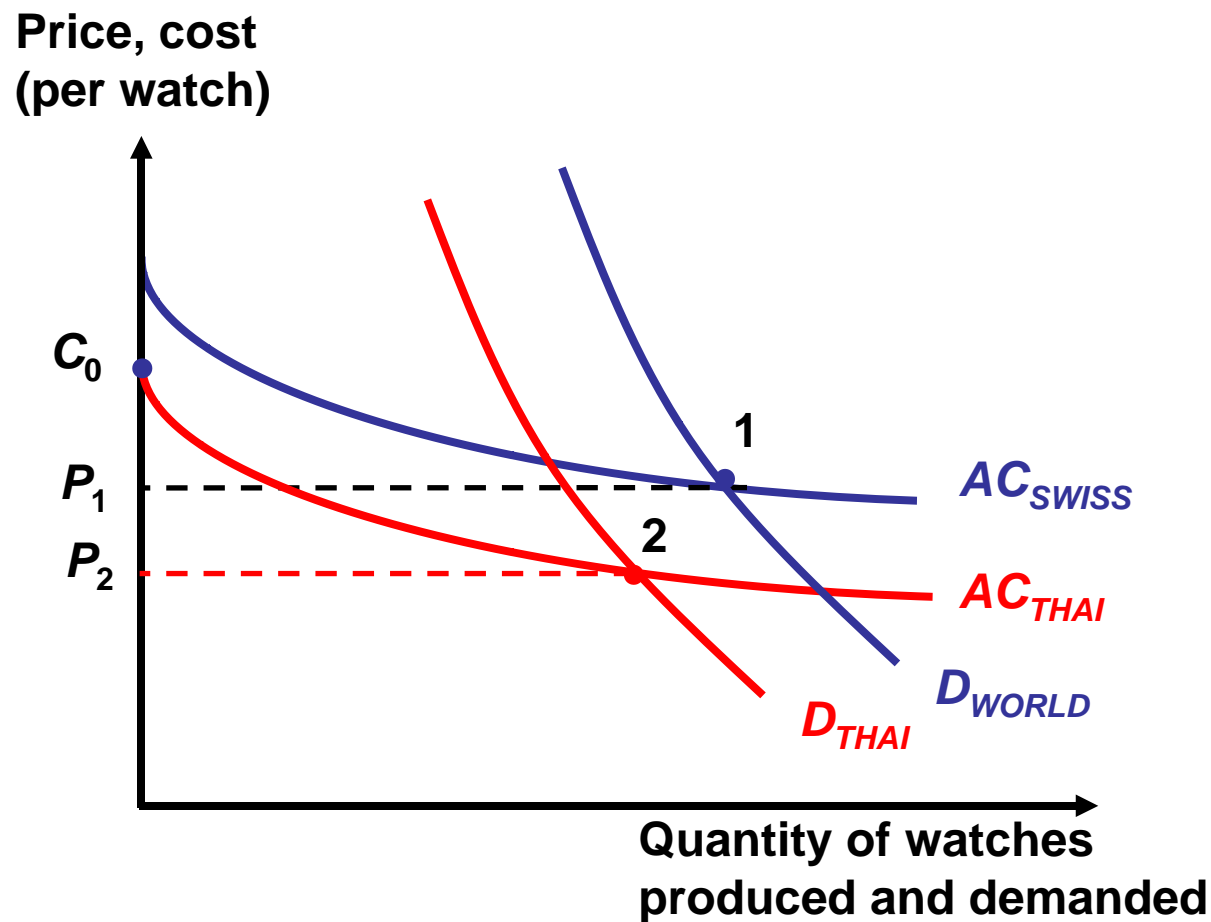


- **Trade and Welfare with External Economies**
 - Trade based on external economies has more ambiguous effects on national welfare than either trade based on comparative advantage or trade based on economies of scale at the level of the firm.
 - An example of how a country can actually be worse off with trade than without is shown in Figure 6-10.

External Economies and International Trade



Figure 6-10: External Economies and Losses from Trade



External Economies and International Trade



■ Dynamic Increasing Returns

● Learning curve

- It relates unit cost to cumulative output.
- It is downward sloping because of the effect of the experience gained through production on costs.

● Dynamic increasing returns

- A case when costs fall with cumulative production over time, rather than with the current rate of production.

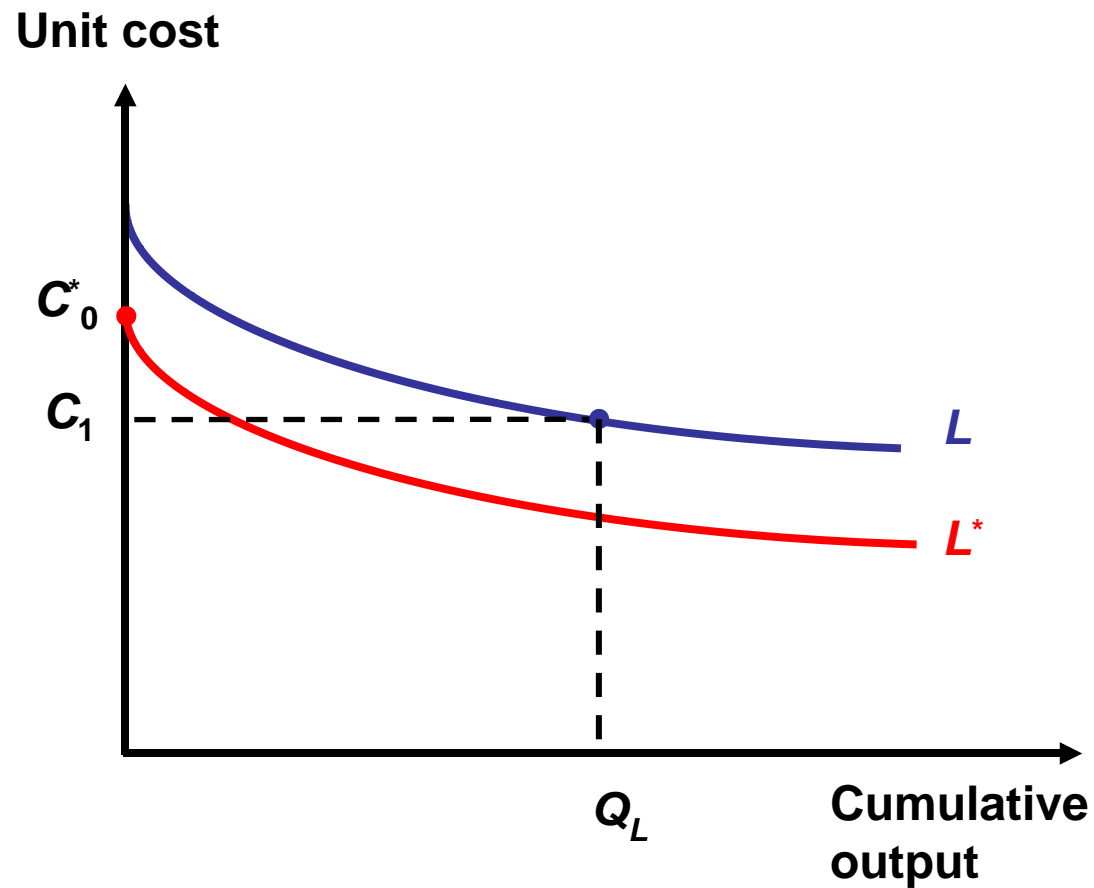
● Dynamic scale economies justify protectionism.

- Temporary protection of industries enables them to gain experience (**infant industry argument**).

External Economies and International Trade



Figure 6-11: The Learning Curve



Summary



- Trade can result from increasing returns or economies of scale, that is, from a tendency of unit costs to be lower at larger levels of output.
- Economies of scale can be internal or external.
- The presence of scale economies leads to a breakdown of perfect competition.
- Trade in the presence of economies of scale must be analyzed using models of imperfect competition.

Summary



- In monopolistic competition, an industry contains a number of firms producing differentiated products.
- Intraindustry trade benefits consumers through greater product variety and lower prices.
- In general, trade may be divided into two kinds:
 - Two-way trade in differentiated products within an industry (intraindustry trade).
 - Trade in which the products of one industry are exchanged for products of another (interindustry trade).

Summary



- Dumping occurs when a firm charges a lower price abroad than it charges domestically.
- Dumping can occur only if two conditions are met:
 - The industry must be imperfectly competitive.
 - Markets must be geographically segmented.
- External economies give an important role to history and accident in determining the pattern of international trade.
- When external economies are important, countries can conceivably lose from trade.

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