

# STUDY UNIT FIVE

## MICROECONOMICS

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This study unit is the first of three study units (“Microeconomics,” “Macroeconomics,” and “International Trade”) related to the economic environment of a business and its industry. It begins with an outline of the microeconomic concepts of supply and demand.

### 5.1 DEMAND, SUPPLY, AND EQUILIBRIUM

#### 1. Demand -- the Buyer's Side of the Market

- a. **Demand** is a **schedule** of the amounts of a good or service that consumers are willing and able to purchase at various prices during a period of time.

- 1) **Quantity demanded** is the amount that will be purchased at a **specific price** during a period of time.

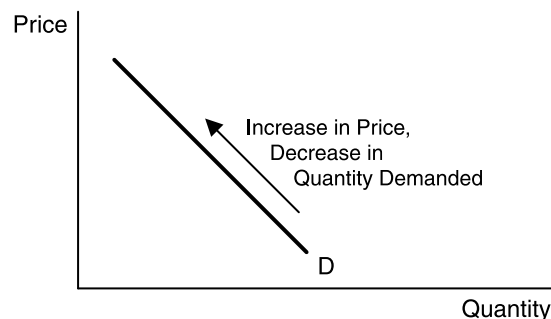
**Demand Schedule**

Price per Unit	Quantity Demanded
\$10	0
\$9	1
\$8	2
\$7	3
\$6	4
\$5	5
\$4	6
\$3	7
\$2	8
\$1	9
\$0	10

- b. A demand schedule can be **graphically depicted** as a relationship between the prices of a commodity (on the vertical axis) and the quantity demanded at the various prices (horizontal axis), holding other determinants of demand constant.

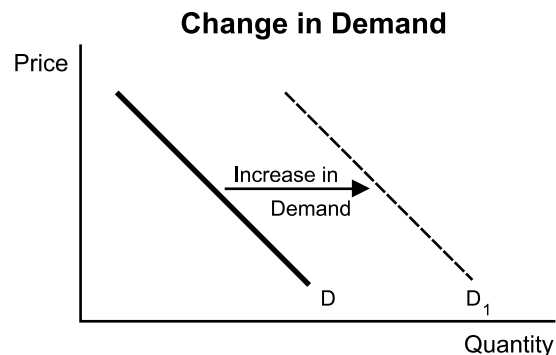
- 1) **The law of demand.** If all other factors are held constant (*ceteris paribus*), the price of a product and the quantity demanded are inversely (negatively) related; i.e., the higher the price, the lower the quantity demanded.

**Law of Demand**



- a) As the price of a good falls, consumers have more **buying power** (also called higher real income). They can buy more of the good with the same amount of money. This is termed the **income effect**.

- b) As the price of one good falls, it becomes cheaper **relative to other goods**. Consumers will thus have a tendency to spend money on the cheaper good in preference to the more expensive one. This is termed the **substitution effect**.
- 2) A change in **price** results in a change in **quantity demanded**, i.e., movement along a demand curve (depicted in the graph on the previous page). A change in one of the **determinants of demand** results in a change in **demand**, i.e., a shift of the curve itself.



- c. The **determinants of demand** are any factors **other than price** that affect the amount of a commodity that consumers purchase.
  - 1) Consumer incomes
    - a) Most goods are **normal goods**, that is, commodities for which demand is positively (directly) related to income, e.g., steak, new clothes, and airline travel.
      - i) As consumer incomes rise, the demand curves for normal goods shift to the right. People with more disposable income are willing to purchase more of these goods at all price levels.
    - b) However, a few goods are **inferior goods**, that is, commodities for which demand is negatively (inversely) related to income, e.g., potatoes, used clothing, and bus transportation.
      - i) As consumer incomes fall, the demand curves for inferior goods shift to the right. People whose disposable income is decreasing are willing to purchase more of these goods at all price levels.
  - 2) Consumer taste and preference
    - a) When consumers' **interest in a particular product** changes, the change is reflected in a shift of the demand curve.
      - i) For example, the wide neckties of the 1970s fell out of favor with men as the narrow ties of the 1980s came into fashion.
      - ii) The sales of wide ties at all price levels fell off and the sales of narrow ties (at all price levels) increased. This was depicted as a leftward shift of the demand curve for wide ties and a rightward shift of the demand curve for narrow ties.
    - b) A related shift is one brought about by **changing technology**.
      - i) For example, as the demand curve for digital cameras shifts to the right, the demand curve for film cameras shifts to the left.
      - ii) As consumers become more and more enamored of digital cameras at all price levels, they are willing to buy ever fewer film cameras (no matter how low the price).

## 3) Prices of related goods

- a) If a **price increase** in A results in an **increase in demand** for B, A and B are said to be **substitutes**. For example, when beef prices rise, the demand for chicken increases.
- b) If a **price increase** in A results in a **decrease in demand** for B, A and B are said to be **complements**. For example, if the price of bread increases, the demand for jelly decreases.
- c) This phenomenon is referred to as cross-elasticity of demand, described under item 1.b. in Subunit 2.

## 4) Consumer expectations

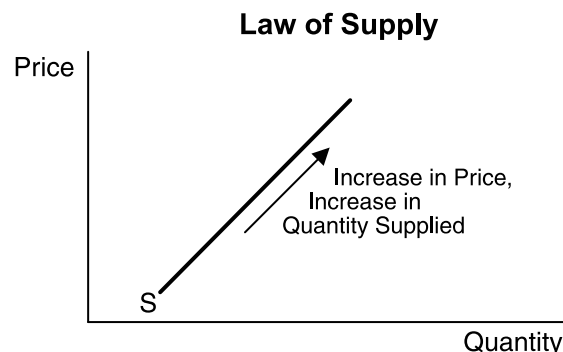
- a) Consumers **anticipating a price increase** for a given product in the near future will buy more of that product in the hopes of avoiding the higher price, driving the current demand curve to the right.
- b) Consumers **anticipating lower incomes** in the near future will forgo planned purchases, driving the current demand curve for those products to the left.

## 5) Consumer demographics

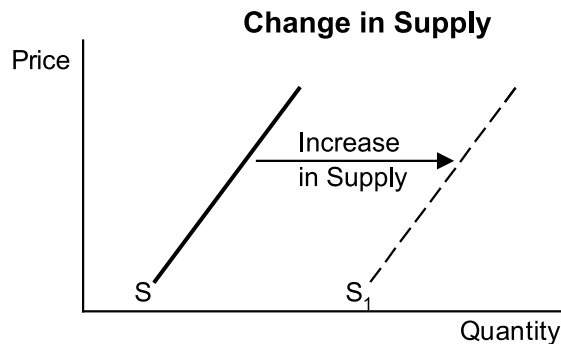
- a) **Changes in population size** are reflected in demand shifts. For example, a larger population will demand more of everything at every price level, reflected in a rightward movement of demand curves.
- b) In addition, **changes within a population** bring about changes in demand. For example, as the number of older citizens increases, the demand curve for elder-care services shifts to the right and the demand curve for baby products shifts to the left.

## 2. Supply -- the Seller's Side of the Market

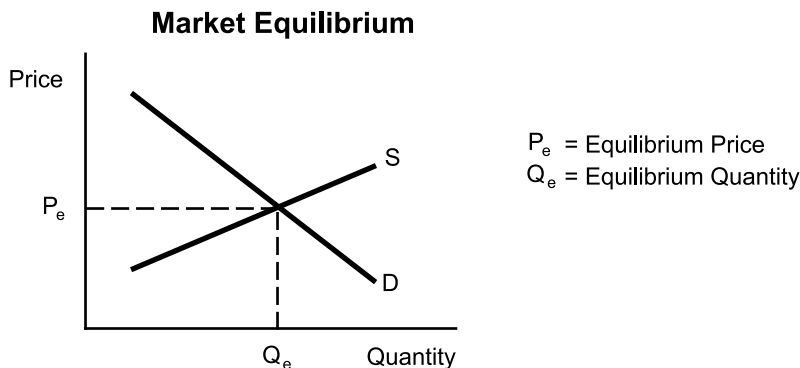
- a. **Supply** is a **schedule** of the amounts of a good that producers are willing and able to offer to the market at various prices during a specified period of time.
  - 1) **Quantity supplied** is the amount that will be offered at a **specific price** during a period of time.
- b. A supply schedule can be **graphically depicted** as a relationship between the prices of a commodity (on the vertical axis) and the quantity offered at the various prices (horizontal axis), holding other determinants of supply constant.
  - 1) **The law of supply.** If all other factors are held constant (*ceteris paribus*), the price of a product and the quantity supplied are directly (positively) related; i.e., the higher the price, the greater the quantity supplied.



- 2) A change in **price** results in a change in **quantity supplied**, i.e., movement along a supply curve (depicted in the graph above). A change in **one of the determinants of supply** results in a change in **supply**, i.e., a shift of the curve itself.



- c. The **determinants of supply** are any factors **other than price** that affect the amount of a commodity that producers offer.
- 1) Costs of inputs
  - 2) Change in efficiency of the production process, e.g., newer technology
  - 3) Expectations about price changes
  - 4) Passage of time
  - 5) Taxes and subsidies
3. **Market demand** is the sum of the individual demand curves of all buyers in the market. **Market supply** is the sum of the individual supply curves of all sellers in the market.
- a. **Market equilibrium** is the combination of price and quantity at which the market demand and market supply curves intersect.



- b. At the point of intersection of the supply and demand curves, anyone wishing to purchase economic goods at the **market price** can do so, and anyone offering the goods can sell everything they bring to market.
- 1) Equilibrium is thus referred to as the **market-clearing price** and the **market-clearing quantity**.
- c. The market forces of supply and demand create an automatic, efficient **rationing system**.
- 1) Whenever **the quantity demanded exceeds the quantity supplied** at the current price, a **shortage** results.
    - a) Buyers will bid up prices, new suppliers will be induced to enter the market, and the shortage will be eliminated.
  - 2) Whenever **the quantity supplied exceeds the quantity demanded** at the current price, a **surplus** results.
    - a) Sellers will cut prices, suppliers will exit the market, and the surplus will be eliminated.

d. **The effects on equilibrium of shifts** in the supply and demand schedules:

	Demand increase	Demand constant	Demand decrease
Supply increase	$P_e$ unknown $Q_e$ up	$P_e$ down $Q_e$ up	$P_e$ up $Q_e$ unknown
Supply constant	$P_e$ up $Q_e$ up	— —	$P_e$ down $Q_e$ down
Supply decrease	$P_e$ up $Q_e$ unknown	$P_e$ up $Q_e$ down	$P_e$ unknown $Q_e$ up

#### 4. Explicit vs. Implicit Costs

a. **Explicit costs** are those requiring actual cash disbursements. For this reason, they are sometimes called out-of-pocket or outlay costs.

- 1) **Explicit costs are accounting costs**; that is, they are recognized in a concern's formal accounting records.
- 2) For example, an entrepreneur opening a gift shop has to make certain cash disbursements to get the business up and running.

Inventory	\$50,000
Display cases	9,000
Rent	4,000
Utilities	1,000
<b>Total explicit costs</b>	<b><u>\$64,000</u></b>

b. **Implicit costs** are those costs not recognized in a concern's formal accounting records.

- 1) **Implicit costs are opportunity costs**, i.e., the maximum benefit forgone by using a scarce resource for a given purpose and not for the next-best alternative.
- 2) To measure the true economic success or failure of the venture, the entrepreneur in the above example must tally up more than just the explicit costs that can easily be found in the accounting records.
  - a) The entrepreneur's opportunity costs are the most important implicit costs. (S)he could have simply gone to work for another company rather than open the gift shop.
  - b) The money put into startup costs could have been invested in financial instruments.
  - c) A **normal profit** is a **crucial implicit cost**. In this example, the normal profit is the income that the entrepreneur could have earned applying his/her skill to another venture.

Salary forgone	\$35,000
Investment income forgone	3,600
Entrepreneurial income forgone	10,000
<b>Total implicit costs</b>	<b><u>\$48,600</u></b>

c. **Economic costs are total costs.**

- 1) The true hurdle for an economic decision is whether the revenues from the venture will cover all costs, both explicit and implicit.

$$\begin{aligned}
 \text{Economic costs} &= \text{Total costs} \\
 &= \text{Explicit costs} + \text{Implicit costs} \\
 &= \$64,000 + \$48,600 \\
 &= \mathbf{\$112,600}
 \end{aligned}$$

## 5. Accounting vs. Economic Profit

- a. **Accounting profits** are earned when the (book) income of an organization exceeds the (book) expenses.

- 1) After the first year of operation, the gift shop owner made a tidy accounting profit.

Sales revenue	\$100,000
Explicit costs	(64,000)
<b>Accounting profit</b>	<b><u>\$ 36,000</u></b>

- b. **Economic profits** are a significantly higher hurdle. They are not earned until the organization's income exceeds not only costs as recorded in the accounting records but the firm's implicit costs as well. Economic profit is also called **pure profit**.

- 1) Once total costs are taken into account, a different picture emerges.

Accounting profit	\$ 36,000
Implicit costs	(48,600)
<b>Economic loss</b>	<b><u>\$(12,600)</u></b>

## 5.2 ELASTICITY

### 1. Elasticity of Demand

- a. **Price elasticity of demand** ( $E_d$ ) measures the sensitivity of the quantity demanded of a product to a change in its price.

$$E_d = \frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in price}}$$

- 1) Elasticity describes the reaction to a change in price **from one level to another**. Thus, the most accurate way of calculating elasticity is the **arc method**, which measures elasticity across a **range**.

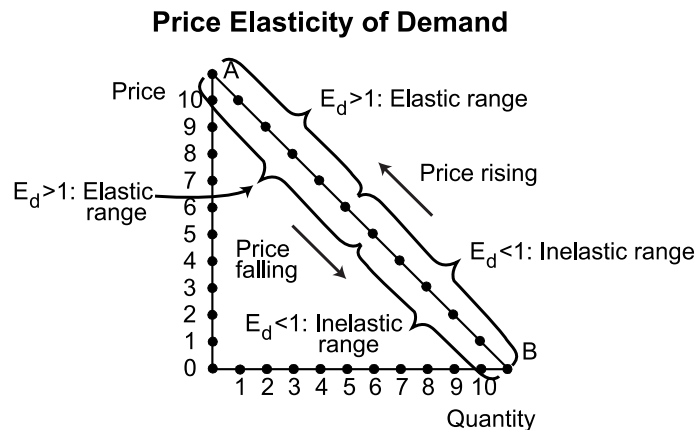
$$E_d = \frac{\% \Delta Q}{\% \Delta P} = \frac{(Q_1 - Q_2) \div [(Q_1 + Q_2) \div 2]}{(P_1 - P_2) \div [(P_1 + P_2) \div 2]}$$

- a) Both numerator and denominator percentages can be calculated as "the change over the midpoint."
- 2) For a demand schedule obeying the **law of demand** (downward sloping), the elasticity coefficient ( $E$ ) is **negative**. However, when interpreting  $E_d$ , the **absolute value** is ordinarily used.

Price Elasticity of Demand

Quantity Demanded	Delta Q	(Q1+Q2) / 2	Numerator	Price	Delta P	(P1+P2) / 2	Denominator	Equals	Range	
			Delta Q over Midpoint				Delta P over Midpoint	Price Elasticity	Price Decreasing	Price Increasing
0	—	—	—	\$10	—	—	—	—	—	—
1	1	0.5	200.00%	\$9	\$1	\$9.50	10.53%	19.000	\$10 to \$9	\$10 to \$11
2	1	1.5	66.67%	\$8	\$1	\$8.50	11.76%	5.667	\$9 to \$8	\$9 to \$10
3	1	2.5	40.00%	\$7	\$1	\$7.50	13.33%	3.000	\$8 to \$7	\$8 to \$9
4	1	3.5	28.57%	\$6	\$1	\$6.50	15.38%	1.857	\$7 to \$6	\$7 to \$8
5	1	4.5	22.22%	\$5	\$1	\$5.50	18.18%	1.222	\$6 to \$5	\$6 to \$7
6	1	5.5	18.18%	\$4	\$1	\$4.50	22.22%	0.818	\$5 to \$4	\$5 to \$6
7	1	6.5	15.38%	\$3	\$1	\$3.50	28.57%	0.538	\$4 to \$3	\$4 to \$5
8	1	7.5	13.33%	\$2	\$1	\$2.50	40.00%	0.333	\$3 to \$2	\$3 to \$4
9	1	8.5	11.76%	\$1	\$1	\$1.50	66.67%	0.176	\$2 to \$1	\$2 to \$3
10	1	9.5	10.53%	\$0	\$1	\$0.50	200.00%	0.053	\$1 to \$0	\$1 to \$2

- a) These relationships can be depicted graphically as follows:



- 3) When the demand elasticity coefficient is
- Greater than one**, demand is in a **relatively elastic** range. A small change in price results in a large change in quantity demanded.
  - Equal to one**, demand has **unitary elasticity** (usually a very limited range). A single-unit change in price brings about a single-unit change in quantity demanded.
  - Less than one**, demand is in a **relatively inelastic** range. A large change in price results in a small change in quantity demanded.
  - Infinite**, demand is **perfectly elastic** (depicted as a horizontal line).
    - In pure competition, the number of firms is so great that one firm cannot influence the market price. The demand curve faced by a single seller in such a market is perfectly elastic (although the demand curve for the market as a whole has the normal downward slope).
    - EXAMPLE:** Consumers will buy a farmer's total output of soybeans at the market price but will buy none at a slightly higher price. Moreover, the farmer cannot sell below the market price without incurring losses.
  - Equal to zero**, demand is **perfectly inelastic** (depicted as a vertical line).
    - Some consumers' need for a certain product is so high that they will pay whatever price the market sets. The number of these consumers is limited and the amount they desire is relatively fixed.
    - EXAMPLE:** Addiction to illegal drugs tends to result in demand that is unresponsive to price changes. In this example, existing buyers (addicts) will not be driven out of the market by a rise in price, and no new buyers will be induced to enter the market by a reduction in price.
- 4) **Factors affecting the price elasticity of demand** are
- Availability of **substitutes**
    - The demand for food taken as a whole is extremely inelastic, but the demand curves for individual foods are highly elastic. Consumers can shift their purchases from one food to another with ease.

- b) **Centrality** to the consumer's existence
    - i) An individual consumer's demand for food, shelter, clothing, utilities, and transportation are highly inelastic. These goods and services have come to be necessities.
    - ii) Yachts, fur coats, and vacations to Bhutan, being luxuries, tend to have more elastic demand curves.
  - c) Percentage of the consumer's **income** expended
    - i) If an item represents a small fraction of a consumer's income, e.g., peppermint candies, his or her demand for it will tend to be inelastic. A large percentage change in its price will not have much impact on the consumer's wallet.
  - d) Passage of **time**
    - i) Demand for a given product tends to become more elastic as time passes because consumers are able to find substitutes.
    - ii) The classic example is gasoline. Drivers have short-term commitments that require the consumption of a certain amount of fuel. With the passage of time, however, they may find more efficient travel routes and purchase vehicles that get better mileage.
- 5) Price elasticity of demand is useful for a firm wondering how a **change in the price** of a product will **affect total revenue** from that product.

**Effect on Total Revenue**

	Elastic Range	Unitary Elasticity	Inelastic Range
Price increase	Decrease	No change	Increase
Price decrease	Increase	No change	Decrease

- b. **Cross-elasticity of demand** measures the percentage change in demand for one good given a percentage change in the price of another good.
- 1) Cross-elasticity of demand mathematically depicts the **substitution effect**. When a price decreases, new buyers will enter the market. The good will be cheaper relative to other goods and is substituted for them.
  - 2) The cross-elasticity coefficient ( $E_{xy}$ ) is found by using the following equation:
 
$$E_{xy} = \frac{\% \Delta Q_x}{\% \Delta P_y} = \frac{\text{Percentage change in quantity demanded of good X}}{\text{Percentage change in price of good Y}}$$
  - 3) If the coefficient is
    - a) **Positive**, the two goods are **substitutes** [see the example in item c.4)]. Substitutability is directly correlated with the magnitude of the positive coefficient.
    - b) **Negative**, the two goods are **complements**. Complementarity is directly correlated with the magnitude of the negative coefficient.
    - c) **Zero**, or near zero, the two goods are unrelated.
  - 4) **EXAMPLE:** The price of orange soda increases 20%, and the demand for root beer increases 10%. Accordingly, orange soda and root beer are substitutes.
 
$$E_{xy} = \frac{10\%}{20\%} > 0$$
  - 5) Cross-elasticity of demand can be used to define a market and to determine an appropriate marketing strategy. In addition, the information can be used to determine what and how much to produce.



- c. **Income elasticity of demand** measures the percentage change in quantity demanded given a percentage change in income.

- 1) Income elasticity of demand mathematically depicts the **income effect**. When a price decreases, individuals have more buying power and will buy more of the product.
- 2) The income elasticity ( $E_I$ ) is found using the following equation:

$$E_I = \frac{\% \Delta Q}{\% \Delta I} = \frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in income}}$$

- 3) If the coefficient is
  - a) **Greater than zero**, the good is considered a **normal good**, also called a superior good. If income rises, consumption of the good rises.
  - b) **Less than zero**, the good is considered an **inferior good**. If income rises, consumption of the good decreases.
- 4) **EXAMPLE:** Income increases by 20%, and the demand for diamonds increases by 15%. Diamonds are normal goods. As people earn more, they purchase more diamonds.

$$E_I = \frac{15\%}{20\%} > 0$$

## 2. Elasticity of Supply

- a. **Price elasticity of supply** ( $E_s$ ) measures the sensitivity of the quantity supplied of a product to a change in its price.

$$E_s = \frac{\text{Percentage change in quantity supplied}}{\text{Percentage change in price}}$$

- 1) The same formula used in the calculation of price elasticity of demand (the arc method) is used to calculate the price elasticity of supply (see item 2. in Subunit 1).
- 2) When the supply elasticity coefficient is
  - a) Greater than one, supply is in a **relatively elastic** range. A small change in price results in a large change in quantity supplied.
  - b) Equal to one, supply has **unitary elasticity** (usually a very limited range). A single-unit change in price brings about a single-unit change in quantity supplied.
  - c) Less than one, supply is in a **relatively inelastic** range. A large change in price results in a small change in quantity supplied.
  - d) Infinite, supply is **perfectly elastic** (depicted as a horizontal line).
    - i) A perfectly elastic supply curve exists only in theory. The costs of inputs and fixed investments in property, plant, and equipment prevent a supplier from charging a single price for the whole range of possible quantities.
  - e) Equal to zero, supply is **perfectly inelastic** (depicted as a vertical line).
    - i) A perfectly inelastic supply curve indicates that, in the very short run, a seller cannot change the quantity supplied.
    - ii) **EXAMPLE:** A farmer offering a perishable good with no means of storage must sell the entire crop regardless of the price buyers offer. The farmer cannot offer a larger quantity because the harvest has ended for the season.

3) **Factors affecting the price elasticity of supply** are

- a) Cost and feasibility of storage
    - i) **EXAMPLE:** A high cost of storage results in low elasticity because, as the price of carrying a good increases, the tendency to hold that good decreases.
  - b) Characteristics of the production process
    - i) **EXAMPLE:** The price elasticity of supply of a joint product may be affected by the demand for the other joint products.
  - c) Time
    - i) **EXAMPLE:** Production of goods, i.e., the ability to supply them, becomes more elastic with time.
- b. **Price and total revenue** always move in the same direction regardless of the price elasticity of supply.

3. Review of Terms

Term	Elasticity	Description
<b><u>A. Price elasticity of demand (supply)</u></b>		
Perfectly or completely inelastic	Zero	Quantity demanded (supplied) does not change as price changes
Inelastic	Greater than zero, less than one	Quantity demanded (supplied) changes by a smaller percentage than price.
Unit elasticity	One	Quantity demanded (supplied) changes by exactly the same percentages as price.
Perfectly, completely, or infinitely elastic	Infinity	Purchasers (sellers) are prepared to buy (sell) at some price and none at an even higher (lower) price.
<b><u>B. Income elasticity of demand</u></b>		
Inferior good	Negative	Quantity demanded decreases as income increases.
Normal good	Positive	Quantity demanded increases as income increases:
Income-inelastic	Less than one	Less than in proportion to income increase
Income-elastic	Greater than one	More than in proportion to income increase
<b><u>C. Cross elasticity of demand</u></b>		
Substitute goods	Positive	Price increase of a substitute leads to an increase in quantity demanded (and less quantity demanded of the substitute).
Complementary goods	Negative	Price increase of a complement leads to a decrease in quantity demanded (and less quantity demanded of the complement).

### 5.3 MARKET STRUCTURES

#### 1. Pure Competition

##### a. Defining Characteristics

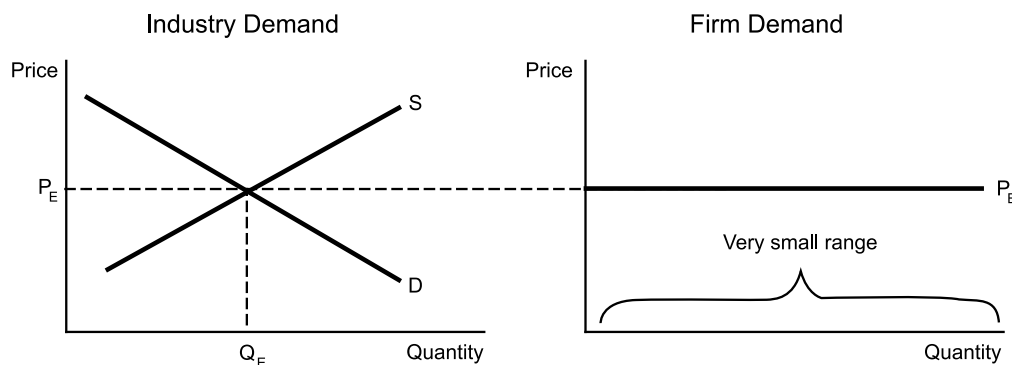
- 1) A **very large number** of buyers and sellers act independently.
  - a) Examples are the stock market and agricultural markets.
- 2) The **product is homogeneous** or standardized.
  - a) Thus, the product of one firm is a **perfect substitute** for that of any other firm.
  - b) The only basis for competition is **price**.
- 3) Each firm produces an immaterial amount of the industry's total output and thus **cannot influence the market price**.
- 4) **No barriers to entry or exit** from the market exist.
- 5) Every firm has **perfect information**.

b. Pure competition **exists only in theory**. However, the model is useful for understanding basic economic concepts. It also provides a standard of comparison for real-world markets.

c. As with any normal good, the **demand curve** for the product of an industry in perfect competition is **downward sloping** (if the industry as a whole expects to increase sales, it must lower price).

- 1) However, since each **individual firm** can satisfy only a small part of the demand facing the industry, its demand curve is **perfectly elastic (horizontal)**.

#### Pure Competition



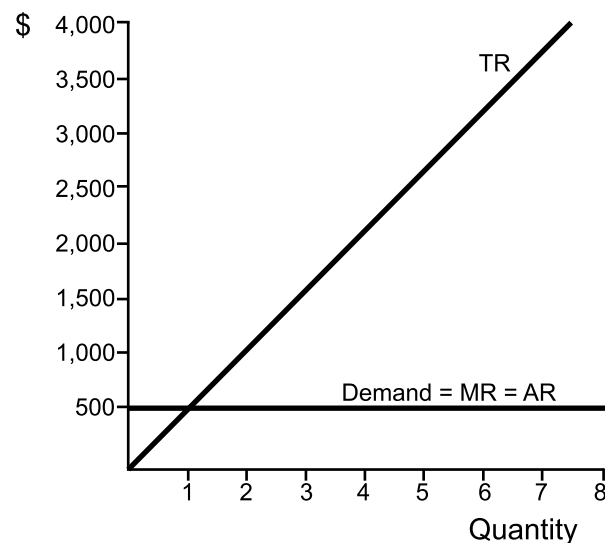
- a) The tiny segment of the industry's demand curve occupied by each individual firm is necessarily at the point of **market equilibrium**.
- b) Firms in perfect competition are therefore called **price takers** because they must sell at the market price.

- 2) The firm's perfectly elastic demand curve means that **marginal revenue equals average revenue equals market price**.

Output	Unit Price (Average Revenue)	Total Revenue	Marginal Revenue
1	\$500	\$ 500	\$500
2	500	1,000	500
3	500	1,500	500
4	500	2,000	500
5	500	2,500	500
6	500	3,000	500
7	500	3,500	500
8	500	4,000	500

- 3) The following graph depicts the relationships among **total revenue (TR)**, **average revenue (AR)**, and **marginal revenue (MR)** for a firm in pure competition.

**Revenue Relationships for  
a Purely Competitive Firm**



- a) **TR** is a straight line with a constant positive slope.
- b) The **price**, **MR**, and **AR** curves are all horizontal since they are identical to the perfectly inelastic demand curve (**Price = MR = AR**).

**d. Short-Run Profit Maximization**

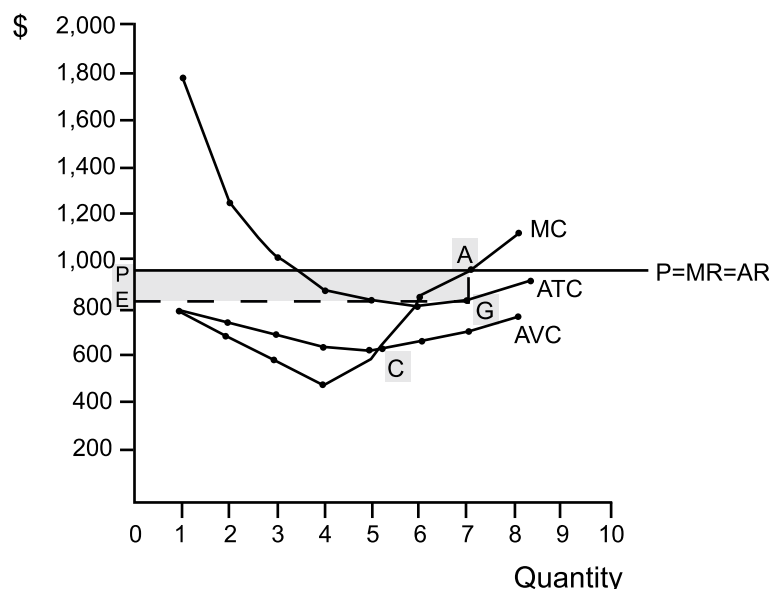
- 1) In the short run, a firm should produce (**continue to operate**) when it can
  - a) Earn a profit or
  - b) Incur a loss smaller than fixed costs.
    - i) In the short run, **operating at a loss** may be preferable to shutting down. This option is indicated when revenues cover all variable costs and some fixed costs (costs incurred even if the firm shuts down).

- 2) If the firm decides to produce, it must next decide how much (the **level of output**). The output level chosen should **maximize profits or minimize losses** in the short run.
  - a) Short-run profit maximization is achieved when the **excess of total revenue (TR) over total cost (TC)** is largest.
    - i) **Losses are minimized** when the excess of TC over TR is smallest and the excess is less than total fixed costs (so that at least some fixed costs are covered).
- 3) A second method applied to short-run production decisions is to **compare marginal revenue (MR) and marginal cost (MC)**.
  - a) **For all market structures**, a firm that does not shut down should **produce** the level of output at which **MR = MC**.
    - i) **As long as the next unit of output adds more in revenue (MR)** than in cost (MC), the firm will increase total profit or decrease total losses.
    - ii) For a purely competitive firm, price = MC is the same as MR = MC.

Output	Average Variable Cost	Average Total Cost	Price = Marginal Revenue	Total Cost	Marginal Cost
1	\$800	\$1,800	\$960	\$1,800	\$ 800
2	750	1,250	960	2,500	700
3	700	1,033	960	3,100	600
4	650	900	960	3,600	500
5	640	860	960	4,200	600
6	680	847	960	5,080	880
7	720	863	960	6,040	960
8	770	895	960	7,160	1,120

- b) The following graph depicts the **short-run profit-maximizing quantity** for a price taker.

**Price Taking for a Purely Competitive Firm**



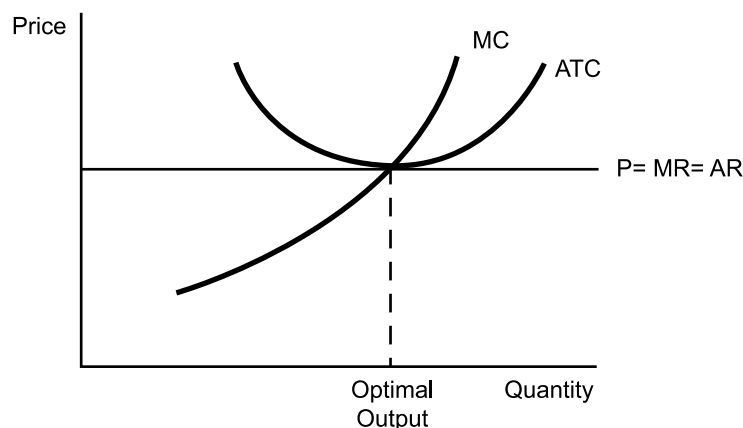
- i) Being in a purely competitive industry, the firm has no choice but to find its price along the horizontal MR curve.

- ii) The profit-maximizing quantity to produce is found at the point where the MC curve crosses MR (following the short-run profit maximizing rule  $MR = MC$ ).
  - iii) Point A reveals a quantity of 7 units. This is confirmed by consulting the table and verifying that, at an output of 7,  $MR = MC$ .
- c) The firm's **short-run supply curve** (points representing output at different prices) consists of the **MC curve above where it crosses average variable cost**.
  - i) Below the intersection of MC and AVC (point C), the firm **will not operate** (it is not covering its fixed costs below this level).
- 4) The **short-run equilibrium price for the industry** is at the intersection of the market demand curve and the market supply curve.
  - a) This price establishes the **short-run equilibrium price for the firm**.
  - b) Thus,  $price = MR$  is a given. The firm's output is based on the given price and its MC (supply) curve.

e. **Long-Run Profit Maximization**

- 1) In the preceding graph, the firm was earning an **economic profit** in the short run.
  - a) In the long run, the **entry of new firms** will eliminate economic profits by driving down the market price as the supply curve shifts to the right.
    - i) If firms are incurring **losses**, some will leave the industry. The resulting leftward shift of the supply curve will increase the market price.
- 2) The standard theory assumes that all firms are **equally efficient**. Thus, the minimum **average total cost (ATC)** is the same for all firms.
  - a) When the entry of new firms or the departure of old firms causes price to equal minimum ATC, firms earn **normal profits** only.
    - i) If **more efficient producers** with lower ATC curves enter the market, they will earn economic profits in the long run.
  - b) Because output is at the level where  $price = MC$ , allocation of resources is optimal.
    - i) Firms produce the ideal output, the output at which ATC is lowest.
    - ii) Price is lower and output greater than in any other market structure.
- 3) The following graph depicts a competitive firm in **long-run equilibrium**. Because  $price = \text{minimum ATC}$  at the optimal output, no economic profit is earned.

**Long-Run Equilibrium for a Purely Competitive Firm**



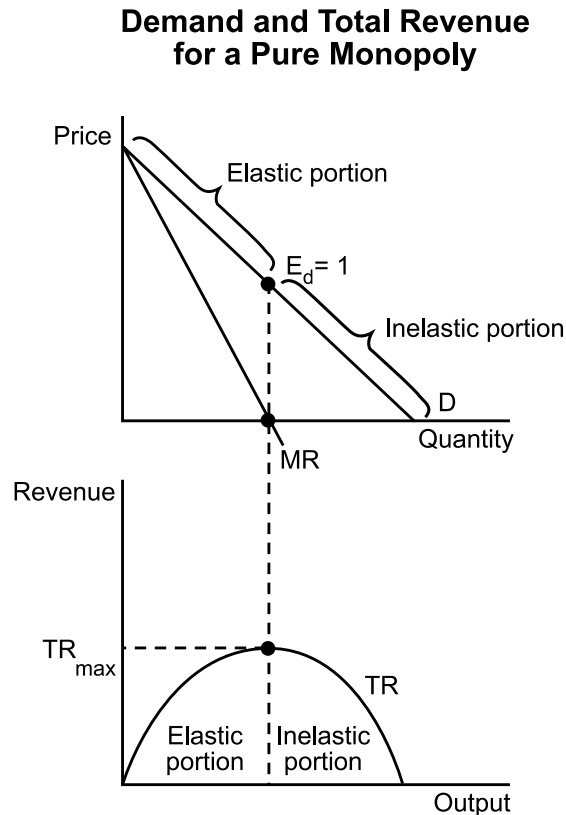
## 2. Pure Monopoly

## a. Defining Characteristics

- 1) The industry consists of **one firm**.
- 2) The product has **no close substitutes**.
- 3) The firm can **strongly influence price** because it is the sole supplier of the product. Economists commonly use two terms to describe a monopolist's pricing behavior:
  - a) **Price maker** draws attention to the monopolist's power to set price as high as it likes, unconstrained by competition.
  - b) **Price searcher**, on the other hand, implies that the monopolistic firm will not simply set prices arbitrarily high but will seek the price that maximizes its profits (explained in item b. below).
- 4) **Entry** by other firms is **completely blocked** in a pure monopoly.
- 5) A **natural monopoly** exists when economic or technical conditions permit only one efficient supplier.
  - a) Very large operations are needed to achieve low unit costs and prices (economies of scale are great).
  - b) Thus, the long-term average cost of meeting demand is minimized when the industry has one firm. Examples are utilities, such as electricity and gas distribution.
- b. The **demand curve** facing a monopolist is **downward sloping** because, as with any normal good, the monopolistic firm can only sell more product by lowering price.
  - 1) However, unlike a competitive firm, which faces only a very small portion of the whole industry's demand curve, the **monopolistic firm's demand curve is the entire industry's demand curve**.
    - a) Thus a monopolist's **marginal revenue continuously decreases** as it raises output. Past the point where  $MR = \$0$ , the monopolist's total revenue begins to decrease.

<u>Output</u>	<u>Unit Price (Average Revenue)</u>	<u>Total Revenue</u>	<u>Marginal Revenue</u>
1	\$960	\$ 960	\$960
2	910	1,820	860
3	860	2,580	760
4	810	3,240	660
5	760	3,800	560
6	710	4,260	460
7	660	4,620	360
8	610	4,880	260
9	560	5,040	160
10	510	5,100	60
11	460	5,060	(40)
12	410	4,920	(140)

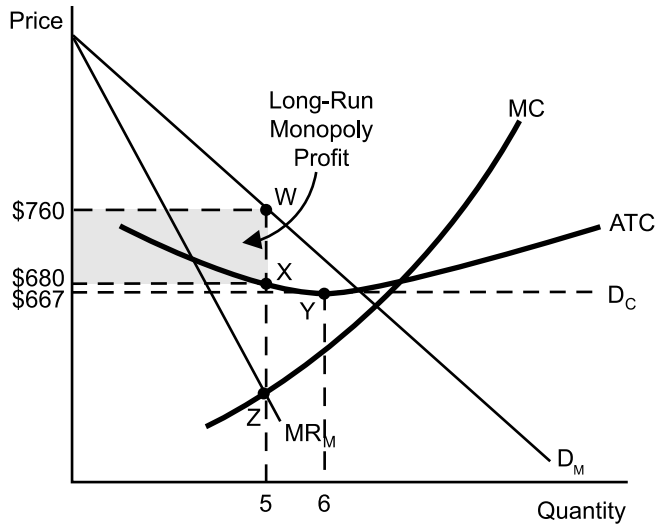
- 2) The following graph depicts the relationships between output and revenue for a pure monopoly:



- a) In the **elastic portion** of the demand curve, **TR increases** with every cut in price.
  - b) At the point of **unitary elasticity**, **TR is maximized**. This is also the point where **MR = \$0**.
  - c) In the **inelastic portion** of the demand curve, **TR decreases** with every cut in price.
- c. Revenue maximization, however, is irrelevant to a monopolist. The rational choice is to **maximize profits**.
- 1) As discussed in Subunit 1, the **competitive firm** must accept the market price and adjust its output accordingly, seeking the level which just covers its average total costs.
    - a) This results in a competitive firm earning **no long-term profits**.
  - 2) The **monopolist**, on the other hand, has the power to set output at the level where profits are maximized, that is, where **MR = MC**.
    - a) The corresponding **price** is found with reference to the (downward-sloping) demand curve.
      - i) Note that monopoly does NOT result in the highest possible price, nor does the monopolist produce at the lowest ATC.
      - ii) Note also that a monopolist has no supply curve. This is because its price-setting power means it is not subject to the same sensitivities in price changes as firms in competition.



### Monopoly Profits



W = profit-maximizing price/quantity for a monopolist  
 X = profit-maximizing average total cost for a monopolist  
 Y = lowest point of average total cost  
 Z = profit-maximizing quantity for a monopolist ( $MR = MC$ )

$D_C$  = demand curve for competitive firm

$D_M$  = demand curve for pure monopolist

$MR_M$  = marginal revenue curve for pure monopolist

- b) The shaded area represents the firm's **excess profits** stemming from its monopoly power.
- c) Note that the monopolist can set price no higher without sacrificing profit. This is the essence of **price searching**.
- 3) The schedule below is the table on which the above graph is based:

#### Price Searching for a Monopolist

Output	Revenue			Cost			Profit/ (Loss)
	Unit Price (Average Revenue)	Total Revenue	Marginal Revenue	Average Total Cost	Total Cost	Marginal Cost	
1	\$960	\$ 960	\$960	\$1,800	\$ 1,800	\$ 800	\$ (840)
2	910	1,820	860	1,200	2,400	600	(580)
3	860	2,580	760	933	2,800	400	(220)
4	810	3,240	660	750	3,000	200	240
5	760	3,800	560	680	3,400	400	400
6	710	4,260	460	667	4,000	600	260
7	660	4,620	360	686	4,800	800	(180)
8	610	4,880	260	725	5,800	1,000	(920)
9	560	5,040	160	778	7,000	1,200	(1,960)
10	510	5,100	60	840	8,400	1,400	(3,300)
11	460	5,060	(40)	909	10,000	1,600	(4,940)
12	410	4,920	(140)	983	11,800	1,800	(6,880)

- a) A key point is that, when the monopolist lowers price to increase sales, the price must be reduced for all units. Thus, **Price = AR**.
- b) If price falls below AVC, the firm will cease operations (the shutdown case).

#### d. Economic Consequences of Monopoly

- 1) Given sufficiently low costs and adequate demand, a monopolist earns an **economic profit in the long run** (if the cost structure is high enough, even a monopoly can lose money).
  - a) Because the firm is restricting the level of output to the profit-maximizing level, consumers have **fewer goods and pay higher prices** than under pure competition.
- 2) Because **price exceeds MC**, resources are **underallocated**.
  - a) Allocation is efficient when price is reduced to MC, the value of what is forgone by society to make the product.

### 3. Monopolistic Competition

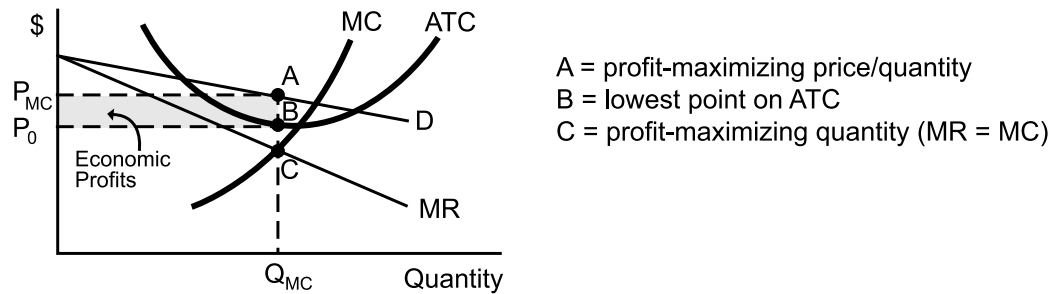
#### a. Defining Characteristics

- 1) The industry has a **large number of firms**.
  - a) The number is fewer than in pure competition, but it is great enough that firms **cannot collude**. That is, they cannot act together to restrict output and fix the price.
    - i) Consequently, firms act independently. The effect of a competitor's actions on its many rivals is small, so these actions are ignored.
- 2) **Products are differentiated**.
  - a) In pure competition, products are standardized, so price is the only basis for competition. In monopolistic competition, products can be differentiated on a basis other than price. Aspects of **nonprice differentiation** include:
    - i) **Quality**, brands, and styles
    - ii) Availability of **related services** (e.g., delivery, repair, or credit)
    - iii) **Accessibility** (e.g., location of retail outlets and store hours)
  - b) When a firm engages in product differentiation, its goals are to
    - i) **Shift its demand curve to the right** and
    - ii) **Make demand less elastic**.
      - The idea is to create a mini-monopoly in one's own product, summed up by the old phrase "only Cadillac makes a Cadillac."
  - c) A firm has **some price control**. Product differentiation allows the firm to charge a higher price up to a point.
- 3) **Few barriers** to entry and exit exist.
  - a) Since firms tend not to be large, **great economies of scale do not exist**.
  - b) The **cost of product differentiation** is the most significant barrier to entry.
    - i) Some existing firms may have patents, trademarks, trade names, and other intangible assets. These increase the difficulty of success for a new firm.
- 4) **Advertising** is crucial.
  - a) Customers must be informed of the nonprice ways in which the firm's product is differentiated from its substitutes.

#### b. To **maximize profits** (or minimize losses) in the short run or long run, a firm in monopolistic competition produces at the level of output at which **MR = MC**.

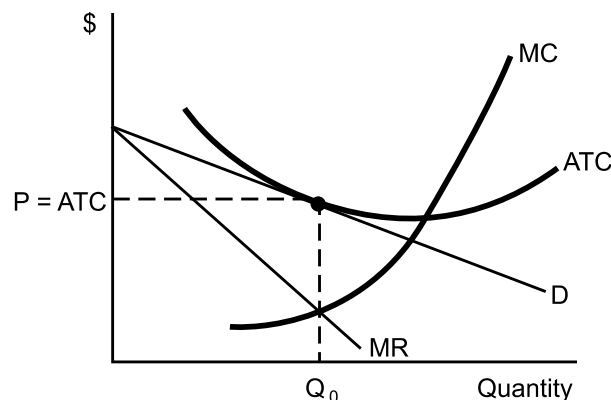
- 1) **Just as for a monopolist**, the MR curve is negatively sloped and lies below the demand curve.
- 2) In monopolistic competition, a firm has **competitors** offering **substitute products**.
  - a) The demand curve is **less negatively sloped than the curve for a pure monopoly** (i.e., more elastic; see the graph on the next page).
    - i) Thus, a small price increase results in a relatively large decrease in quantity demanded, especially if the product is not differentiated.
  - b) The profit-maximizing quantity is found where  $MR = MC$ .
    - i) Since the price corresponding to this level of output exceeds the price found on the ATC curve, the firm will **earn economic profits in the short run**.

### Short-Run Profits in Monopolistic Competition



- 3) In the **long run**, a firm in monopolistic competition tends to earn only a **normal profit**.
- Attracted by excess short-run profits, **competitors enter the market**.
  - More substitutes are now available to consumers, driving the **demand curve to the left**, eventually moving it so far that it is just tangent to the ATC curve.
    - The excess profits that originally attracted new entrants are now gone.
  - Firms may cut price (further squeezing profits) or increase advertising (driving the ATC curve up) in an attempt to gain market share at the expense of competitors. **Short-run losses** ensue.
  - Unprofitable firms exit the market**, reducing the number of substitutes and allowing the demand curve to move back to the right.
    - Price will settle at equilibrium where demand is tangent to ATC. The **long-run tendency** is thus merely to **break even**.

### Long-Run Equilibrium in Monopolistic Competition



- 4) As with pure monopoly, **price exceeds MC** and **underallocation** of resources results. Monopolistic competition shares three other aspects with pure monopoly:
- Price exceeds the lowest point of ATC. Thus, **production is inefficient** and firms are too small.
  - Price is higher and output lower** than in pure competition.
  - If price falls below AVC, the firm will cease operations (the shutdown case).

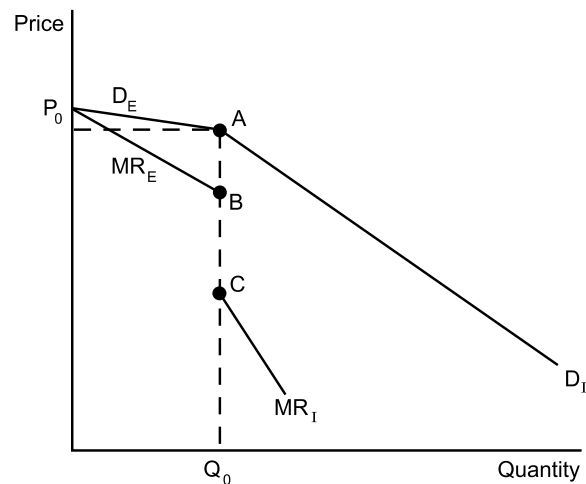
#### 4. Oligopoly

##### a. Defining Characteristics

- 1) The industry has **few large firms**.
  - a) The degree to which the market leaders dominate an industry is measured by the **concentration ratio**.
    - i) Frequently a four-firm concentration ratio is used. If **40% or more** of the market is controlled by the **four largest firms**, that industry is considered an oligopoly.
  - b) Firms operating in an oligopoly are **mutually aware** and **mutually interdependent**. Their decisions as to price, advertising, etc., are to a very large extent dependent on the actions of the other firms.
- 2) **Products** can be **differentiated** (e.g., autos) or **standardized** (e.g., steel).
- 3) **Prices** tend to be **rigid** (sticky) because of the interdependence among firms.
  - a) An oligopoly must often confront **cyclical or seasonal fluctuations** in the quantity demanded. Price rigidity makes it difficult for oligopolists to maintain sales levels by reducing price when the demand curve shifts to the left or by increasing sales and output when demand increases.
- 4) **Entry is difficult** because of barriers that can be
  - a) Natural, e.g., an absolute cost advantage, or
  - b) Created, e.g., ongoing advertising or ownership of patents.

- b. The price rigidity normally found in oligopolistic markets can be explained in part by the **kinked demand curve** theory. The essence of the theory is that firms will follow along with a price decrease by a competitor but not a price increase (see the graph on the next page).
  - 1) If price and quantity for the industry are at P and Q, a firm that **raises its price** will move into the **elastic portion** of the demand curve ( $D_E$ ).
    - a) A **small increase** in price in this portion of the curve leads to a **large decline** in quantity demanded.
    - b) Competitors have little incentive to follow suit, so the price-raising firm loses market share.
  - 2) On the other hand, if the firm **cuts its price**, it enters the **inelastic portion** of the demand curve ( $D_I$ ).
    - a) **Small decreases** in price result in **large gains** in sales. However, the discontinuous marginal revenue curve (BC) means that **marginal revenue falls drastically** upon the occurrence of a small price cut.
    - b) Competitors must cut their prices as well so that the first firm gains no market share.
  - 3) Price and quantity will therefore remain “sticky” at point A on the demand curve.

### Kinked Demand for an Oligopoly



- 4) To avoid the hazards of the kinked demand curve, **price leadership** is typically employed in oligopolistic industries.
  - a) Under price leadership, **price changes are announced** first by a major firm in the industry. Once the industry leader has spoken, other firms match the price charged by the leader.
- c. A **cartel** arises when a group of oligopolistic firms join together for price-fixing purposes. This practice is illegal except in international markets.
  - 1) For example, the international diamond cartel DeBeers has successfully maintained the market price of diamonds for many years by incorporating into the cartel almost all major diamond-producing sources.
  - 2) A cartel is a **collusive oligopoly**. Its effects are similar to those of a monopoly. Each firm will restrict output, charge a higher (collusive or agreed-to) price, and earn the maximum profit.
    - a) Thus, each firm in effect becomes a monopolist, but only because it is colluding with other members of the cartel.
- d. A **group boycott** also can affect demand and prices. A boycott is a concerted effort to avoid doing business with a particular supplier.