

A market is described as a monopoly if it has only one supplier. This single firm faces the entire market demand curve. Using its knowledge of this demand curve, the monopoly makes a decision on how much to produce.

### Main Characteristics of Pure Monopoly

- Single Seller وجود بائع واحد في السوق  
A pure monopoly is an industry in which a single firm is the sole producer of a specific good or services; the firm and the industry are synonymous.
- No Close Substitutes عدم وجود بدائل للسلعة المنتجة  
Pure monopoly's product is unique in that there are no close substitutes.
- Price Maker القدرة على التحكم بالسعر  
The pure monopolist controls the total quantities supplied and has considerable control over price; it is a price maker. *The pure monopoly has a downward sloping demand curve*; it can change its product price by changing the quantity of the product it produces.
- Blocked Entry: وجود عوائق دخول  
Entry is totally blocked in pure monopoly, those barriers may be economic, technological, legal, or of some other type.

### Examples of Monopoly

In most cities, government-owned or government-regulated public utilities—*natural gas* and *electric companies*, the *water company*, and the *local telephone company*—are all monopolies or virtually so.

### Causes of Monopoly (عوائق الدخول) اسباب وجود المحتكر

The reason monopoly markets exist is that other firms find it unprofitable or impossible to enter the market. Barriers to entry are the source of all monopoly power. If other firms could enter the market, there would, by definition, no longer be a monopoly. There are two general types of barriers to entry: technical barriers and legal barriers.

### Technical Barriers to Entry عوائق دخول تكنولوجية

A primary technical barrier to entry is that the production of the good in question exhibits decreasing average cost over a wide range of output levels. That is, relatively large-scale firms are more efficient than small ones. In this situation, one firm finds it profitable to drive others out of the industry by price cutting.

تتمتع بعض الشركات او المؤسسات بالقوة الاحتكارية بسبب امتلاكها للالات والمعدات اللازمة لانتاج السلعة

### Natural barriers to entry (Natural Monopoly) (احتكار طبيعي) عوائق دخول طبيعية

Once a monopoly has been established, entry by other firms is difficult because any new firm must produce at low levels of output and therefore at high average costs. Because this barrier to entry arises naturally as a result of the technology of production, the monopoly created is sometimes called a natural monopoly.

يعزى هذا النوع من الاحتكار إلى وجود وفورات كبيرة (economies of scale) جداً مما لا يسمح بوجود أكثر من مؤسسة واحدة في سوق تلك السلعة. وهذا يتيح لتلك المؤسسة إنتاج السلعة بمعدلات تكلفة متدنية لدرجة أن أي منتج جديد يحاول الدخول لإنتاج نفس السلعة تكون معدل تكلفته إنتاجه أعلى من معدل تكلفة المنتج الحالي. مما يقلل من قدرة هذا المنتج الجديد على منافسة المنتج القديم في مجال السعر مما يضطره للخروج من السوق ويبقى المنتج الأصلي وحيداً في السوق.

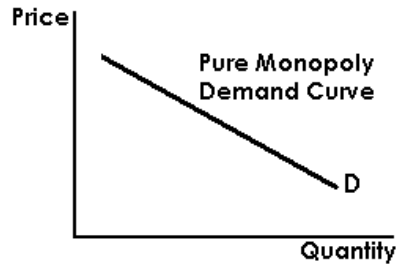
## Legal Barriers to Entry عوائق دخول قانونية

Many pure monopolies are created as a matter of law rather than as a result of economic conditions. One important example of a government-granted monopoly position is the legal protection provided by a patent.

ينتج هذا النوع من الاحتكار عن طريق إعطاء الحكومة امتيازات لشركات معينة الإنتاج سلع ذات طبيعة خاصة مثل شركات الكهرباء والمياه والهاتف. وقد تعطى الحكومة امتياز لأحد المنتجين لإنتاج سلعة ليتمتع بحق الاختراع ولو لفترة زمنية محدودة.

## Monopoly Demand

The demand curve for the monopolist is quite different from that of the pure competitive. Because the pure monopolist is the industry, its demand curve is the market demand curve. And because market demand is not perfectly elastic, the monopolist's demand curve is down sloping (the quantity demanded increases as price decreases).



## Average Revenue and Marginal Revenue

The monopolist average revenue is the price it receives per unit sold.

$$\text{Total Revenue (TR)} = P \times Q$$

$$\text{Average Revenue (AR)} = \frac{TR}{Q} = \frac{P \times Q}{Q} = P$$

Marginal revenue: change in revenue resulting from a one unit increase in output.

$$\text{Marginal Revenue} = \frac{\Delta TR}{\Delta Q} = \frac{\partial TR}{\partial Q}$$

$$MR \neq P, MR < P$$

### Example:

A monopolist's faces a market demand curve given by:  $Q = 70 - P$ . What is the marginal revenue function of the monopolist?

$$TR = P \times Q$$

$$\text{From the demand curve: } P = 70 - Q$$

$$TR = (70 - Q) Q = 70Q - Q^2$$

$$\text{Marginal Revenue} = \frac{\partial TR}{\partial Q} = 70 - 2Q$$

## Profit Maximization:

To maximize profits, a monopoly will choose the output at which marginal revenue equals marginal costs:

$$MR = MC$$

The demand curve is downward-sloping so marginal revenue is less than price (To sell more, the firm must lower its price on all units to be sold in order to generate the extra demand).

A monopoly will produce an output level in which price exceeds marginal cost.

### Example

A monopolist's faces a market demand curve given by:  $Q = 70 - P$ . Assume that the monopolist has a total cost given by:  $TC = 0.25Q^2 - 5Q + 300$ .

a. What price quantity combination will be chosen to maximize profits?

$$\text{To max profit: } MR = MC$$

$$TR = P \times Q = (70 - Q)Q = 70Q - Q^2 \quad \rightarrow \quad MR = 70 - 2Q$$

$$MC = \frac{\partial TC}{\partial Q} = 0.5Q - 5$$

$$\text{To max profit: } MR = MC \quad \rightarrow \quad 70 - 2Q = 0.5Q - 5 \quad \rightarrow \quad 2.5Q = 75 \quad \rightarrow \quad Q = 30 \text{ units}$$

$$\text{From the demand curve: } P = 70 - Q = 70 - 30 = \$40.$$

b. What is the monopolist profit?

$$\text{Profit} = TR - TC = 70Q - Q^2 - (0.25Q^2 - 5Q + 300) = 75Q - 1.25Q^2 - 300$$

$$\text{Profit} = 75(30) - 1.25(30)^2 - 300 = 2,250 - 1,125 - 300 = \$825$$

### Example

A firm faces a demand curve given by:  $q = 100 - 0.2P$ . And a total cost curve of the form  $TC = 2q^2 + 24q + 30$ .

A. Calculate the marginal revenue curve in term of q.

$$TR = P * q$$

$$\text{From the demand function } P = 500 - 5q$$

$$TR = (500 - 5q)q = 500q - 5q^2.$$

$$MR = \frac{\partial TR}{\partial q} = 500 - 10q$$

B. What output level should the firm produce to maximize profit?

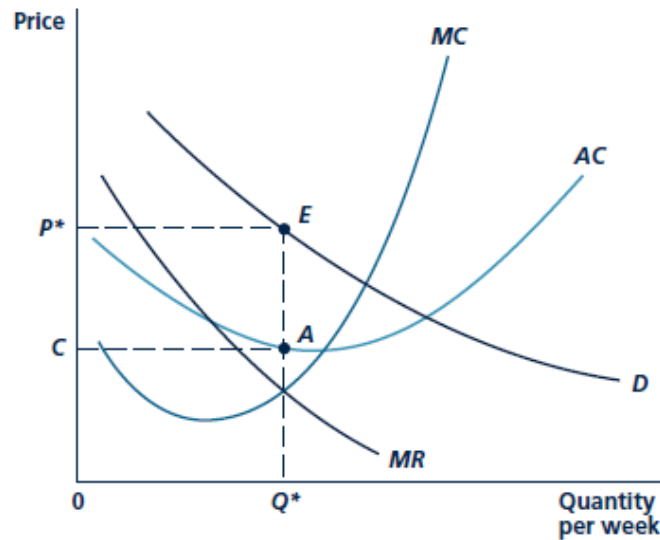
$$\text{To max profit: } MR = MC$$

$$MC = \frac{\partial TC}{\partial Q} = 4q + 24$$

$$MR = MC \quad \rightarrow \quad 4q + 24 = 500 - 10q \quad \rightarrow \quad 14q = 476 \quad \rightarrow \quad q = 476/14 = 34 \text{ units.}$$

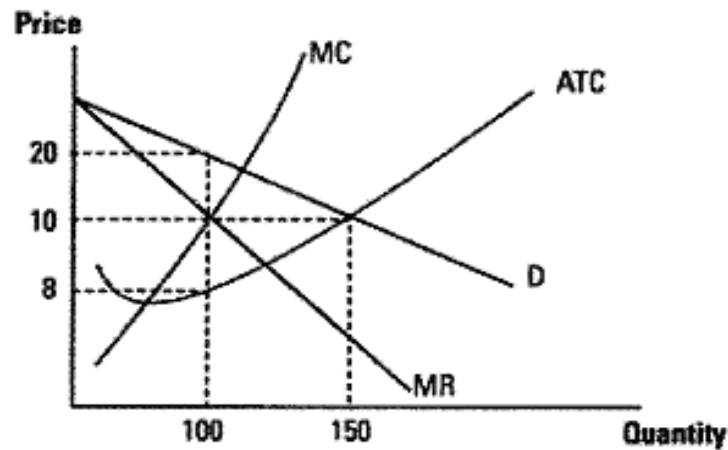
## Profit Maximization: A Graphic Treatment

A profit-maximizing monopolist produces that quantity for which marginal revenue is equal to marginal cost. In the diagram, this quantity is given by  $Q^*$ , which yields a price of  $P^*$  in the market. Monopoly profits can be read as the rectangle  $P^*EAC$ .



### Example

The diagram depicts the situation facing a monopolist. To maximize profits, what output level should the firm produce and what is the monopolist profit.



To max profit:  $MR = MC$  (نقطة تقاطع المنحنيين): At  $Q = 100$

$$\text{Profit} = Q (P - ATC)$$

At  $Q = 100$ ,  $P = 20$  and  $ATC = 8$

$$\text{Profit} = Q (P - ATC) = 100(20 - 8) = \$1,200$$

## Monopoly Supply Curve:

The pure monopolist has no supply curve. There is no unique relationship between price and quantity supply for a monopolist. Like the competitive firm, the monopolist equates marginal revenue and marginal cost to determine output, but for the monopolist marginal revenue is less than price. Because the monopolist does not equate marginal cost and price, it is possible for different demand condition to bring about different prices for the same output.

Conclusion: There is no single, unique price associated with each output level that maximizes profit, and so there is no supply curve for the pure monopoly.

## WHAT'S WRONG WITH MONOPOLY?

Monopolies pose several problems for any economy. Here, we look at two specific complaints: *first, monopolies produce too little output; and second, the high prices they charge* end up redistributing wealth from consumers to the “fat cat” firm owners. Our discussion will be illustrated by Figure below, which compares the output produced in a market characterized by perfect competition with the output produced in the same market when it only contains one firm.

### In a perfectly competitive market:

To maximize profit:  $MC = P$  (نقطة تقاطع منحنى الطلب مع منحنى التكاليف الحدية)

Would produce output level  $Q^*$  at a price of  $P^*$ .

Consumer surplus = Area  $FEP^*$  (المساحة المحصورة بين منحنى الطلب وسعر التوازن)

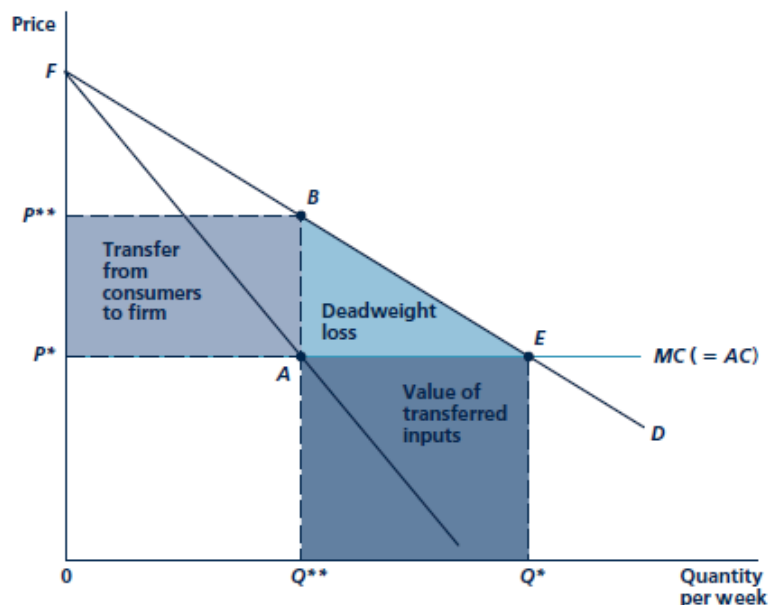
### In a monopolist market

To maximize profit:  $MR = MC$  (نقطة تقاطع منحنى الإيراد الحدي مع منحنى التكاليف الحدية)

Would produce output level  $Q^{**}$  at a price of  $P^{**}$ .

Consumer surplus = Area  $FBP^{**}$

Because of monopoly, the consumer losses from a surplus the area equal to  $P^{**}BEP^*$ . The area  $P^{**}BAP^*$  is transferred into monopoly profits. The area  $BEA$  is a deadweight loss of a monopoly



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## Example

A monopolist faces a market demand curve given by:  $Q = 70 - P$ , the monopolist's marginal revenue curve is given by:  $MR = 70 - 2Q$ .

- a. If the monopolist can produce at constant average and marginal cost of  $AC = MC = 6$ , what output level will the monopolist choose in order to max profit?

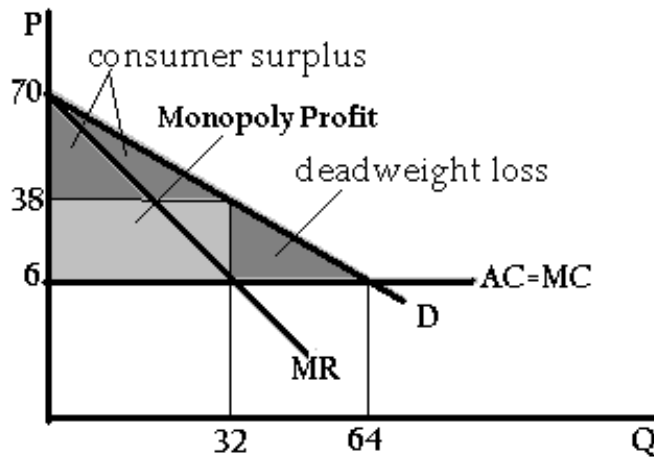
To max profit:  $MR = MC$

$$TR = P \times Q = (70 - Q)Q = 70Q - Q^2 \quad \rightarrow MR = 70 - 2Q$$

$$MR = MC \quad \rightarrow 70 - 2Q = 6 \quad \rightarrow 2Q = 64 \quad \rightarrow Q = 32$$

- b. What is the price at this output level? What are the monopolist's profits? What is the consumer surplus? What is the deadweight loss of monopoly?

From the demand curve:  $Q = 70 - P \rightarrow 32 = 70 - P \rightarrow P = \$38$



$$\text{Monopolist's profit} = (38 - 6) \times 32 = \$1,024$$

$$\text{Consumer surplus} = (70 - 38) \times 32 = \$1,024$$

$$\text{Deadweight loss} = \frac{1}{2} \{(38 - 6) \times (64 - 32)\} = \$512$$

## Price Discrimination

*Price discrimination occurs if identical units of output are sold at different prices.*

التمييز السعري هو بيع نفس السلعة بأكثر من سعر. في التمييز السعري البحت، يقوم البائع بتحصيل أقصى سعر يرغب كل عميل في دفعه. في الأشكال الأكثر شيوعاً للتمييز السعري، يضع البائع العملاء في مجموعات استناداً إلى سمات معينة (الدخل مثلاً) ويتقاضى كل مجموعة سعراً مختلفاً.

يعتبر التمييز السعري أكثر قيمة عندما يكون الربح الناتج عن فصل الأسواق أكبر من الحفاظ على الجمع بين الأسواق. هذا يعتمد على المرونة النسبية للطلب في الأسواق الفرعية. يتحمل المستهلكون في السوق الفرعية غير المرنة نسبياً سعراً أعلى، في حين أن السعر في الأسواق الفرعية المرنة نسبياً يتم دفعه سعر أقل.

If the monopolist could sell its product at different prices to different customers, a new opportunity exists as shown in Figure.

### Perfect Price Discrimination

*Perfect price discrimination is selling each unit of output for the highest price obtainable.*

### Market Separation

A second way that a monopoly firm may be able to practice price discrimination is to separate its potential customers into two or more categories and to charge different amounts in these markets. If buyers cannot shift their purchasing from one market to another in response to price differences, this practice may increase profits over what is obtainable under a single-price policy.

*If two markets are separate, a monopolist can maximize profits by selling its product at different prices in the two markets. The firm would choose that output for which  $MC = MR$  in each of the markets. The diagram shows that the market that has a less elastic demand curve is charged the higher price by the price discriminator.*

#### Example:

Suppose a textbook monopoly can produce any level of output it wishes at a constant marginal and average cost of \$5 per book. Assume that the monopoly sells its book in two different markets that are separated by some distance. The demand curve in the first market is given by:  $Q_1 = 55 - P_1$  and the curve in the second market is given by:  $Q_2 = 70 - 2P_2$

If the monopolist can maintain the separation between the two markets, what level of output should be produced in each market and what price will prevail in each market? What are total profits in this situation?

<p><b><u>Market 1:</u></b></p> <p>Total revenue curve = <math>P_1 \times Q_1</math></p> <p>From the demand curve: <math>P_1 = 55 - Q_1</math>  <math>TR_1 = 55Q_1 - Q_1^2 \Rightarrow MR_1 = 55 - 2Q_1</math></p> <p>To max profit in market 1: <math>MR_1 = MC</math></p> <p><math>55 - 2Q_1 = 5 \Rightarrow 2Q_1 = 50 \Rightarrow Q_1 = 25</math> units</p> <p>But <math>P_1 = 55 - Q_1 \Rightarrow P_1 = 55 - 25 = \\$30</math></p> <p>Profit = <math>TR_1 - TC_1</math></p> <p><math>TC_1 = ATC \times Q_1 = 5Q_1</math></p> <p><math>\Rightarrow</math> Profit = <math>55Q_1 - Q_1^2 - 5Q_1 = 50Q_1 - Q_1^2</math></p> <p>Profit = <math>50(25) - (25)^2 = 1,250 - 625 = \\$625</math></p>	<p><b><u>Market 2:</u></b></p> <p>Total revenue curve = <math>P_2 \times Q_2</math></p> <p>From the demand curve: <math>P_2 = 35 - \frac{1}{2} Q_2</math>  <math>TR_2 = 35Q_2 - \frac{1}{2} Q_2^2 \Rightarrow MR_2 = 35 - Q_2</math></p> <p>To max profit in market 2: <math>MR_2 = MC</math></p> <p><math>35 - Q_2 = 5 \Rightarrow Q_2 = 30</math> units</p> <p>But <math>P_2 = 35 - \frac{1}{2} Q_2 \Rightarrow P_2 = 35 - \frac{1}{2} (30) = \\$20</math></p> <p>Profit = <math>TR_2 - TC_2</math></p> <p><math>TC_2 = ATC \times Q_2 = 5Q_2</math></p> <p><math>\Rightarrow</math> Profit = <math>35Q_2 - \frac{1}{2} Q_2^2 - 5Q_2 = 30Q_2 - \frac{1}{2} Q_2^2</math></p> <p>Profit = <math>30(30) - \frac{1}{2} (30)^2 = 900 - 450 = \\$450</math></p>
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Total profits in this situation = profit in market 1 + profit in market 2

Total profits in this situation =  $625 + 450 = \$1,075$