

Topic 5: Monopoly

Price and Output Decisions Under Monopoly

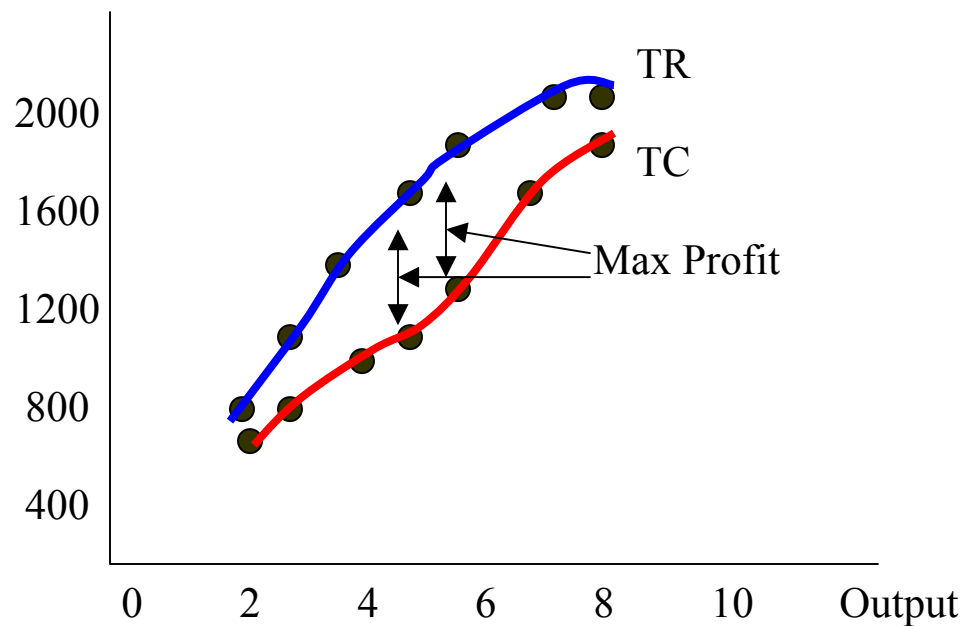
Assumptions of a Pure Monopolist:

- 1) C_____ cannot enter the industry
- 2) No close _____.

In order to **maximize profit**, an unregulated monopolist will choose the price and output levels at which the difference between total revenue and total cost is **largest**.

Output	Price	TR	TC	Total Profit
2	400	800	640	
3	350	1,050	790	
4	342.5	1,370	960	
5	331	1,655	1,150	
6	311	1,866	1,361	
7	278	1,946	1,590	
8	250	2,000	1,840	

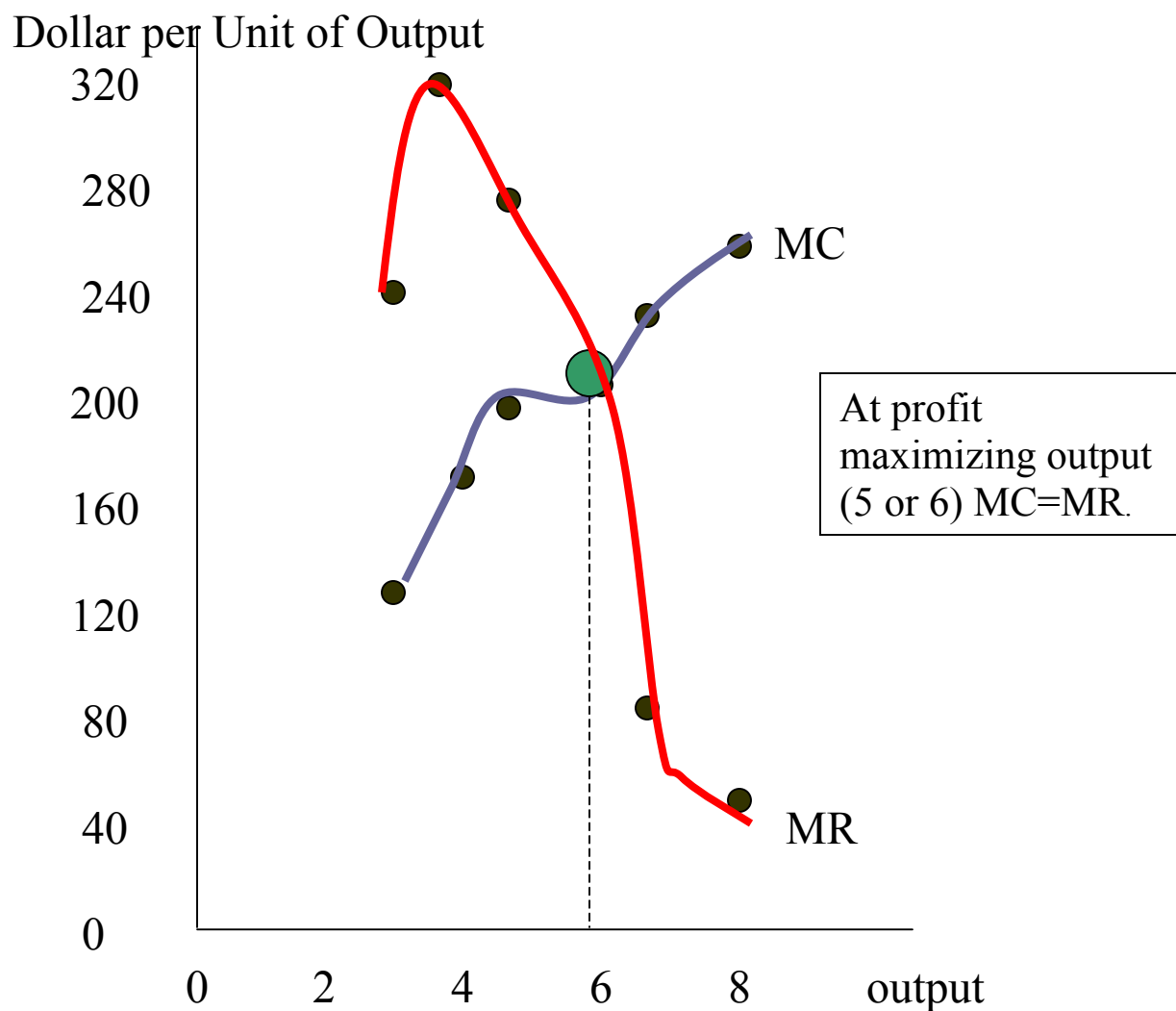
Revenue, Cost, Profit



Under monopoly the firm will maximize profit if it sets its output rate at the point at which marginal _____ equals marginal _____.

Output	MC	MR	Total Profit
3	150	250	
4	170	320	
5	190	285	
6	211 *	211 *	
7	229	80	
8	250	54	

(MC and MR figures pertain to the interval between the indicated quantity of output and one unit less than the indicated quantity of output.)



The point where $MC = MR$ is a *necessary* condition for _____ maximization.

Proof:

Let π represent the firm's profit. Then, the monopolist's profit equals:

$$\pi = TR - TC$$

and the change in profit due to a change in output is:

$$\frac{\partial \pi}{\partial Q} = \frac{\partial TR}{\partial Q} - \frac{\partial TC}{\partial Q}$$

Setting $\frac{\partial \pi}{\partial Q} = 0$ to obtain the conditions under which profit is at a maximum, we find that:

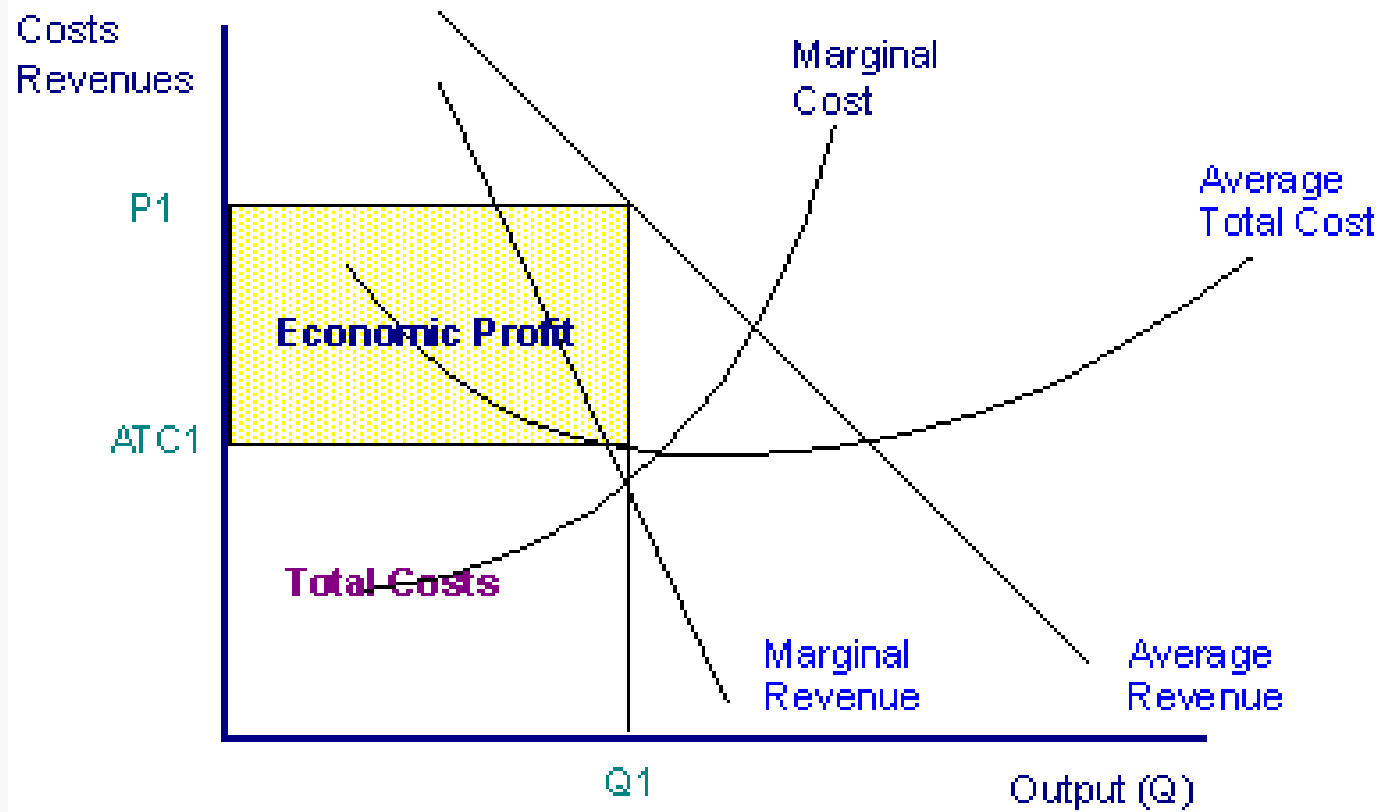
$$\boxed{\begin{array}{l} \frac{\partial TR}{\partial Q} = \frac{\partial TC}{\partial Q} \\ MR = MC \end{array}}$$

Thus, marginal revenue must equal marginal _____ when profits are maximized.

(Slope of the profit function is _____ when profit is maximized)

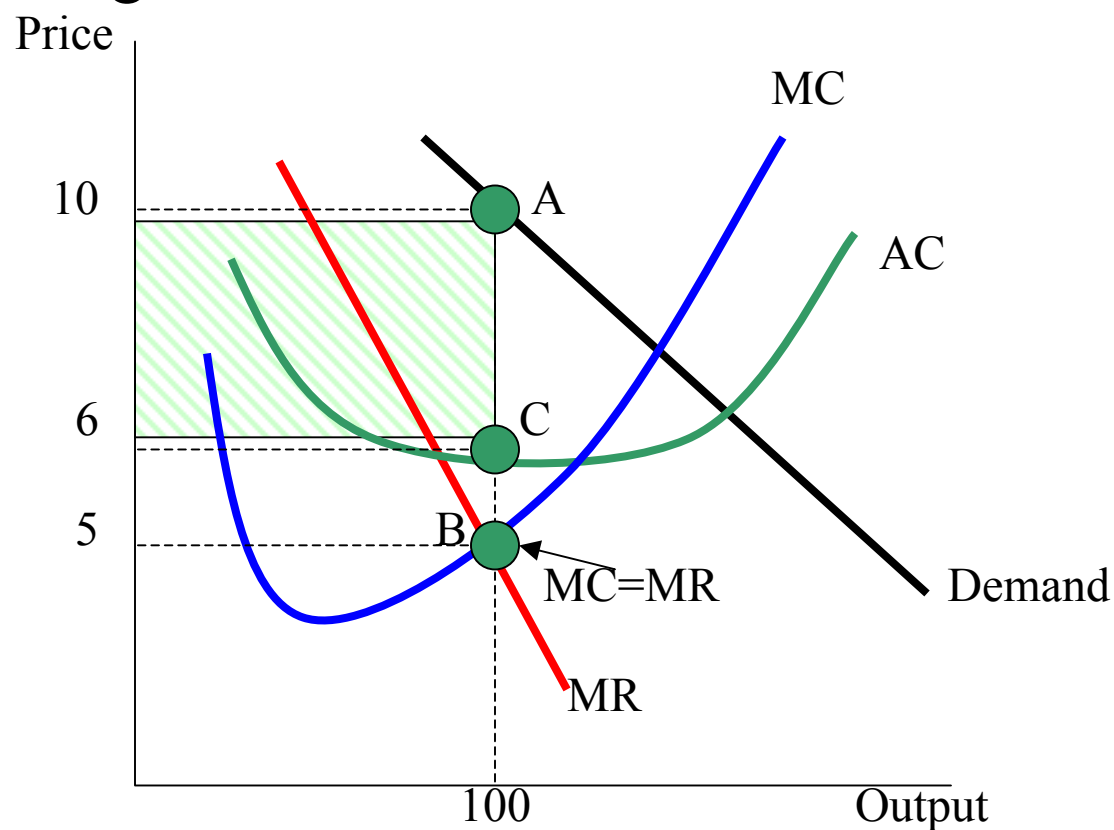
Monopoly Profits

Monopolist maximises profit when
marginal cost = marginal revenue



The Output and Price Decision

The price and output decision of the monopolist are shown in the figure:



$$\text{Profit} = 10 - A - C - 6 = (4) * (100) = \underline{\hspace{2cm}}$$

To maximize profit, the monopolist should produce an output where ____ curve intersects the ____ curve.

If the monopolist produced $Q=100$ units, the demand curve shows that it must set a price of $P=\$10$.

Note: Since the monopolist is the only member of the industry, the demand curve for the output of the monopolist is the industry demand curve. So, in contrast to perfect competition, where the demand curve of the individual firm is horizontal, the demand curve for the monopolists' output, slopes downward and to the right.

Most monopolized industries set a higher _____ and produce a lower output than in a perfectly competitive market.

This is because the perfectly competitive firm operates at the point where _____ equals MC, whereas the monopolist operates at a point at which _____ is greater than MC.

To see this consider the following proof:

$$MR = P \left(1 - \frac{1}{P_E} \right)$$

where MR is the marginal revenue

P is the price

P_E is the price elasticity of demand

Since monopolists set marginal revenue equal to marginal cost, it follows that at the point where profit is maximized:

$$MR = MC = P \left(1 - \frac{1}{P_E} \right)$$

Re-arranging the above expression:

$$P = \frac{MC}{\left(1 - \frac{1}{P_E} \right)}$$

And, since $|P_E| > 0$, it follows that $\left(1 - \frac{1}{P_E} \right) < 1$ and ***p must be greater than MC.***

Numerical Illustration: **The Kentwood Company**:

To illustrate how price and output can be chosen to maximize profit, consider the Kentwood Company, a monopolist, producing and selling a product with the demand curve:

$$P = 30 - 6Q$$

where P is price in (\$' thousands), and Q is the firm's output (in thousands of units).

The firm's total cost function is:

$$C = 14 + 3Q + 3Q^2$$

where C is total cost in (\$'s million).

From the demand curve, we can determine the firm's total revenue which is:

$$TR = PQ = (30 - 6Q) Q = 30Q - 6Q^2$$

Thus, marginal revenue equals:

$$\frac{\partial TR}{\partial Q} = \frac{\partial(30Q - 6Q^2)}{\partial Q} = 30 - 12Q$$

From the total cost function, we can determine the marginal cost:

$$MC = \frac{\partial TC}{\partial Q} = \frac{\partial(14 + 3Q + 3Q^2)}{\partial Q} = 3 + 6Q$$

Setting $MR=MC$:

$$30 - 12Q = 3 + 6Q$$

and solving for Q , we find that $Q=1.5$.

Inserting 1.5 for Q in the demand curve equation,

$$P=30-6Q,$$

we find that $P= 21$.

Thus, to maximize profit, the Kentwood Company should set a price of \$21,000 and produce and sell 1.5 thousand units.

If it does, its profit will equal:

$$\begin{array}{ccccccc} [30(1.5) - 6(1.5)^2] & - & [14 + 3(1.5) + 3(1.5)^2] & = & \$6.25 \text{ million} \\ \text{(TR)} & & \text{(TC)} & & = \text{profit} \end{array}$$

Two Part Tariffs

A monopolist sometimes requires the consumer to pay an initial _____ for the right to buy its product as well as a usage fee for each unit of the product that he or she buys. This is known as a **two part tariff**.

Examples:

Telephone companies charge a basic monthly fee for telephone service plus an amount for usage.

Hydro: basic minimum plus usage

If a monopolist uses this pricing technique, it must determine how high the initial fee must be as well as the size of the usage fee.

The lower the initial fee, the greater the number of consumers that will purchase the right to buy the product.

Hence, lower initial fees are likely to result in greater _____ from the sales of the product.

But, low initial fees may eat into the _____ of the firm. Consequently, the monopolist would be expected to choose the initial fee and usage fee so that its total profit is at a maximum.



Example: Disneyland, in California, used to charge an entrance fee and a fee for each ride the customer went on. In the early 1980s, Disneyland eliminated the fee for individual rides and raised the entrance fee. The managers at Disneyland must have concluded that this would increase the park's profits.

Examples of two-part tariffs

[\[edit\]](#)

The following items could be identified as two part tariffs; but it is possible some of them could be debated on the basis of the presence of fixed costs such as insurance which the firm cannot recoup in any other way.

- "membership discount retailers" such as shopping clubs that charge an annual fee for admission to the point of sale and also charge for your purchases
- amusement parks where there are admission fees and also per-ride fees
- cover charge for bars combined with per drink fees
- credit cards which charge an annual fee plus a per-transaction fee
- loyalty cards or clubs
- landline telephones where there is a fee to use the service ("line rental") and also a fee per call. The line rental covers the cost of providing the service, the per minute charge covers the cost of placing the call on the network.

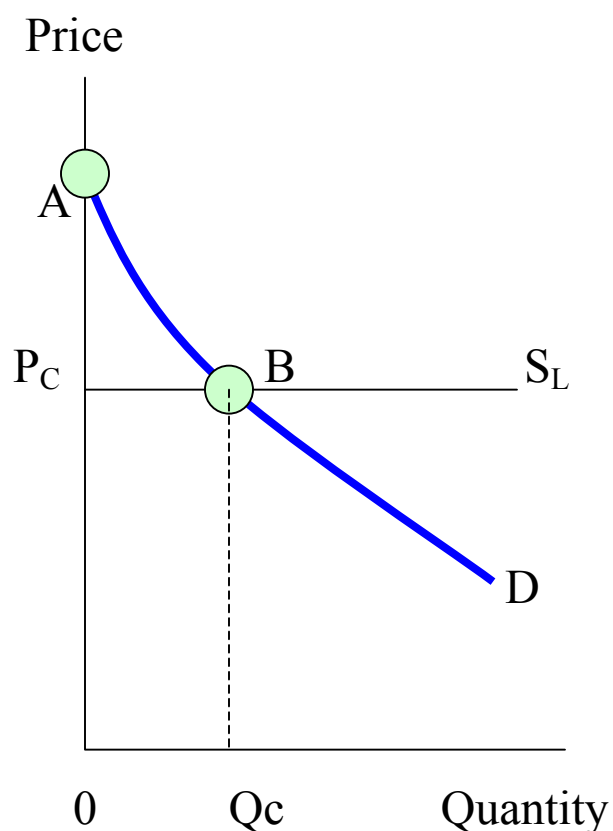
References

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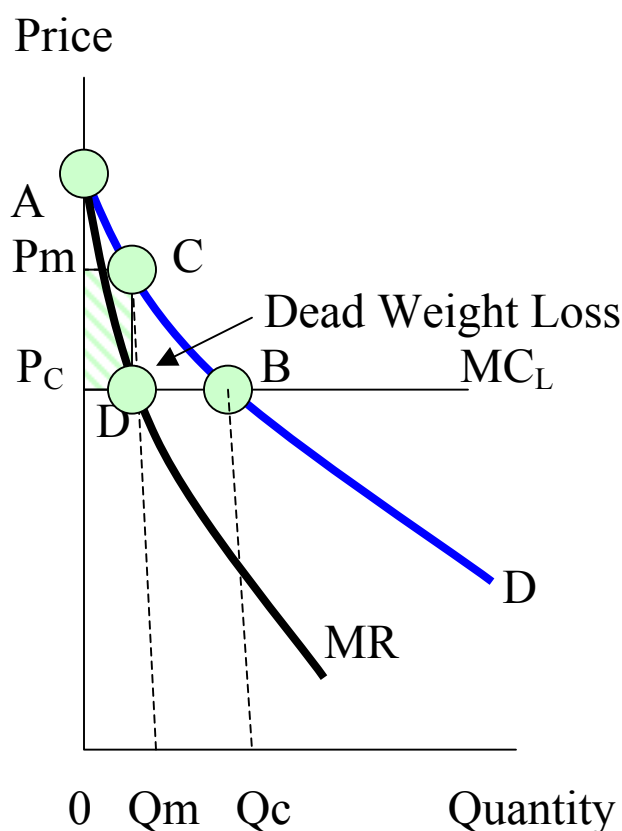
- Waldman, Don E. (2004). "12.2 Two-Part Tariffs, Bundling and Tying", *Microeconomics*. Pearson Addison Wesley, 332-335. ISBN 0-201-65877-1.

The Social Objection to Monopoly

To illustrate, compare the prices and quantities produced under monopoly and perfect competition and determine the social cost of monopoly.



Competitive Industry



Monopoly

The first diagram shows the competitive price and output in a competitive industry.

► Consumer surplus is equal to P_cAB .

In the long run, the supply function is horizontal.

► Producer surplus is zero.

In the second diagram the monopoly price is P_m and output is Q_m .

Price is higher and quantity produced is lower.

► Consumer surplus is smaller and is equal to P_mAC .

A monopoly transfers part of consumer surplus to the monopolist through profits earned by the monopolist: Area P_cP_mCD .

Since output is smaller, the monopoly creates a **deadweight loss of monopoly** equal to area DCB .

The social objection to monopoly is that it creates a deadweight loss, so total _____ is not maximized.

Note:

The primary complaint about monopoly is that the monopolist produces too few _____, not that it charges too high a _____. Since fewer resources are employed in the monopolistic market, resources are inefficiently allocated into other industries.

