Market structures

Perfect competition and monopoly

What is a competitive market?

- A perfectly *competitive market* has the following characteristics:
  - There are many buyers and sellers in the market.
  - The goods offered by the various sellers are largely the same.
  - Firms can freely enter or exit the market.

What is a competitive market?

- As a result of its characteristics, the perfectly competitive market has the following outcomes:
  - The actions of any single buyer or seller in the market have a negligible impact on the market price.
  - Each buyer and seller takes the market price as given.

The Revenue of a Competitive Firm

- Total revenue for a firm is the selling price times the quantity sold.

$$TR = P \cdot Q$$

  - Total revenue is proportional to the amount of output.
  - The price does not depend on the quatity soled by the individual firm.

The Revenue of a Competitive Firm

- *Average revenue* tells us how much revenue a firm receives for the typical unit sold

$$AR = \frac{TR}{Q} = P$$

- For competitive firms, average revenue equals the price of the good.

Table 1 Total, Average, and Marginal Revenue for a Competitive Firm

Quantity	Price	Total Revenue	Average Revenue	Marginal Revenue
(Q)	(P)	(TR = P × Q)	(AR = TR/Q)	(MR = ΔTR/ΔQ)
1 gallon	$6	$ 6	?	?
2	6	12		
3	6	18		
4	6	24		
5	6	30		
6	6	36		
7	6	42		
8	6	48		

Table 1 Total, Average, and Marginal Revenue for a Competitive Firm

Quantity	Price	Total Revenue	Average Revenue	Marginal Revenue
(Q)	(P)	(TR = P × Q)	(AR = TR/Q)	(MR = ΔTR/ΔQ)
1 gallon	$6	$ 6	$6	?
2	6	12	6	
3	6	18	6	
4	6	24	6	
5	6	30	6	
6	6	36	6	
7	6	42	6	
8	6	48	6	

Table 1 Total, Average, and Marginal Revenue for a Competitive Firm

Quantity	Price	Total Revenue	Average Revenue	Marginal Revenue
(Q)	(P)	(TR = P × Q)	(AR = TR/Q)	(MR = ΔTR/ΔQ)
1 gallon	$6	$ 6	$6	
2	6	12	6	$6
3	6	18	6	6
4	6	24	6	6
5	6	30	6	6
6	6	36	6	6
7	6	42	6	6
8	6	48	6	6

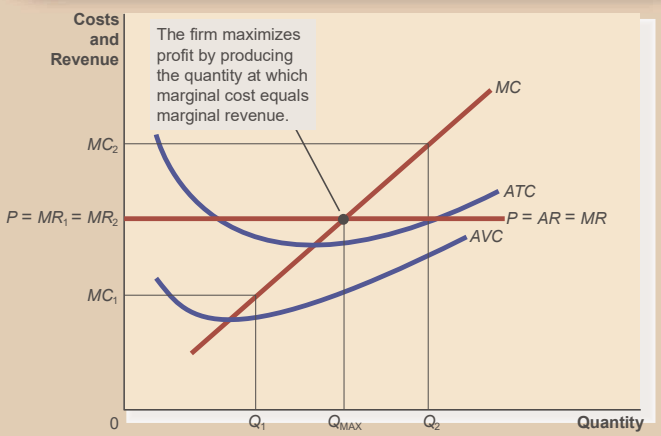
Firms profits

- Firm profits are calculated as
$$Profit = TR - TC$$
  - TR – total revenues
  - TC – total costs
- Optimal quantity maximizes the profit, hence ensures that
$$MR = MC$$
  - MR – marginal revenues
  - MC – marginal costs

Table 2 Profit Maximization: A Numerical Example

Quantity	Total Revenue	Total Cost	Profit	Marginal Revenue	Marginal Cost	Change in Profit
(Q)	(TR)	(TC)	(TR – TC)	(MR = ΔTR/ΔQ)	(MC = ΔTC/ΔQ)	(MR – MC)
0 gallons	$ 0	$ 3	−$3			
				$6	$2	$4
1	6	5	1			
				6	3	3
2	12	8	4			
				6	4	2
3	18	12	6			
				6	5	1
4	24	17	7			
				6	6	0
5	30	23	7			
				6	7	−1
6	36	30	6			
				6	8	−2
7	42	38	4			
				6	9	−3
8	48	47	1			

Figure 1 Profit Maximization for a Competitive Firm

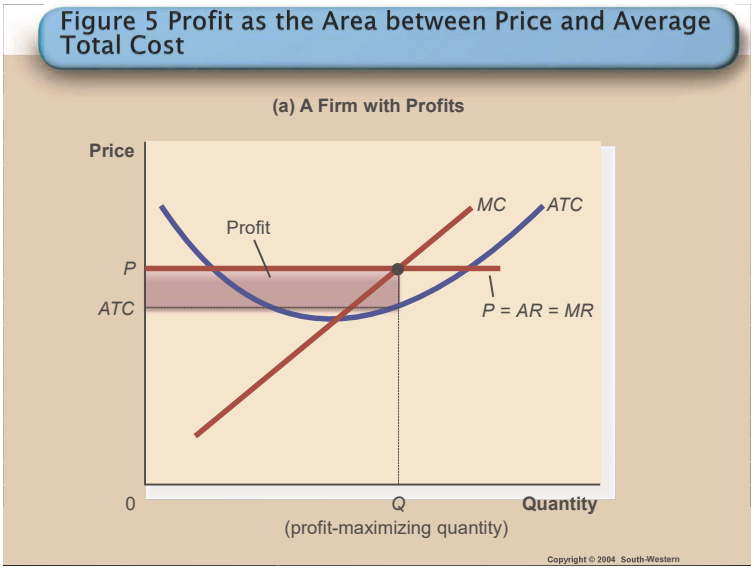


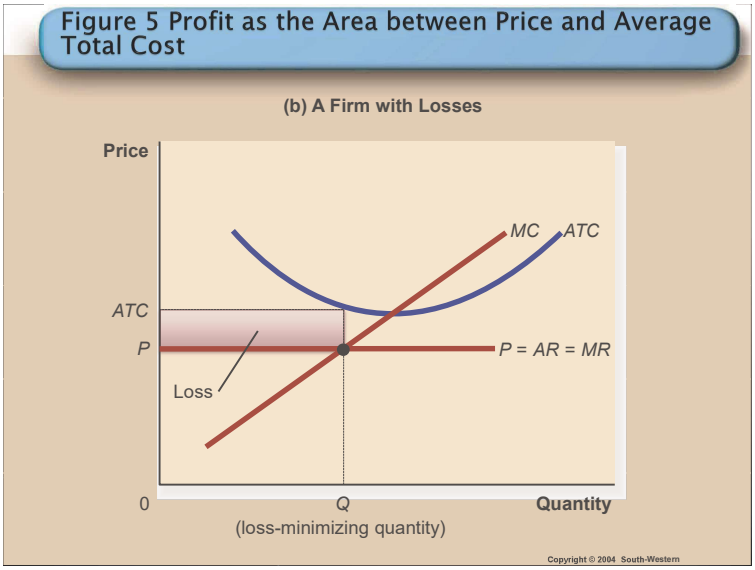
Profits

- Average profits

$$ATR - ATC = P - ATC$$

  - Positive profits: $P > ATC$
  - Loses: $P < ATC$





Competitive market

- Profits in the short- and long-run

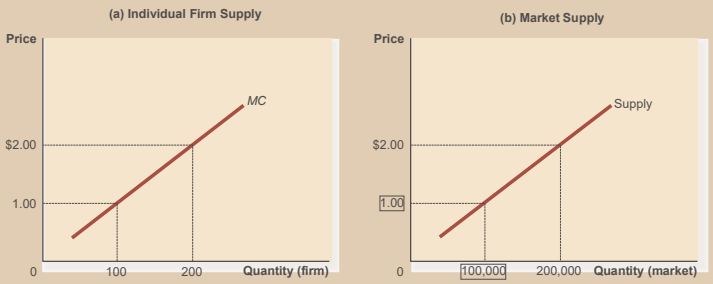
The supply curve in a competitive market

- Market supply equals the sum of the quantities supplied by the individual firms in the market.

The Short Run: Market Supply with a Fixed Number of Firms

- For any given price, each firm supplies a quantity of output so that its marginal cost equals price.
- The market supply curve reflects the individual firms' marginal cost curves.

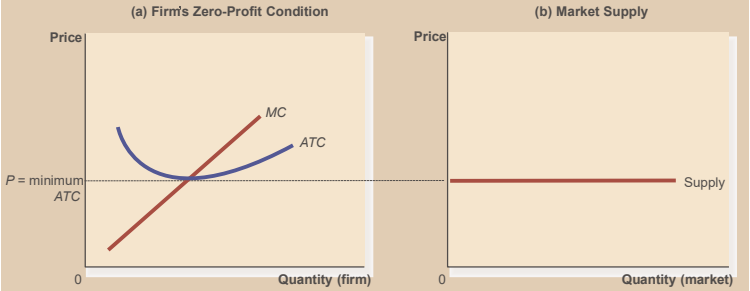
Figure 6 Market Supply with a Fixed Number of Firms



The Long Run: Market Supply with Entry and Exit

- Firms will enter or exit the market until profit is driven to zero.
- In the long run, price equals the minimum of average total cost.
- The long-run market supply curve is horizontal at this price.

Figure 7 Market Supply with Entry and Exit



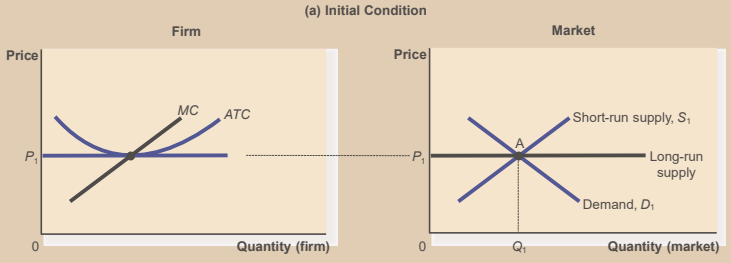
The Long Run: Market Supply with Entry and Exit

- At the end of the process of entry and exit, firms that remain must be making zero economic profit.
- The process of entry and exit ends only when price and average total cost are driven to equality.
- Long-run equilibrium must have firms operating at their efficient scale.

A Shift in Demand in the Short Run and Long Run

- An increase in demand raises price and quantity in the short run.
- Firms earn profits because price now exceeds average total cost.

Figure 8 An Increase in Demand in the Short Run and Long Run



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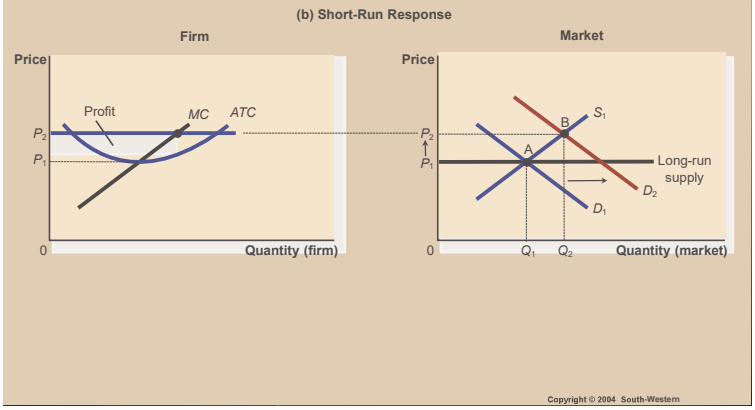
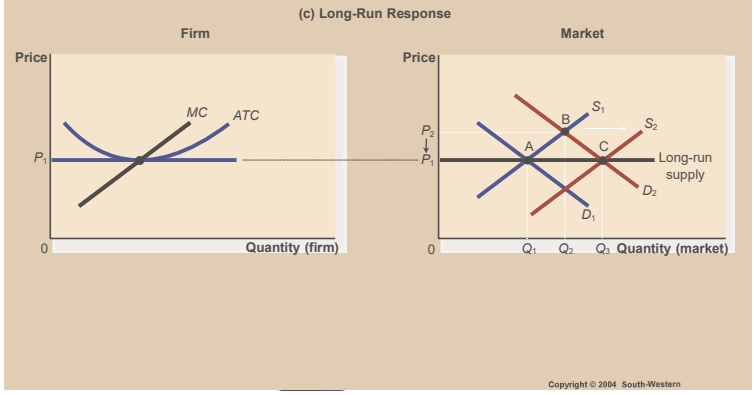
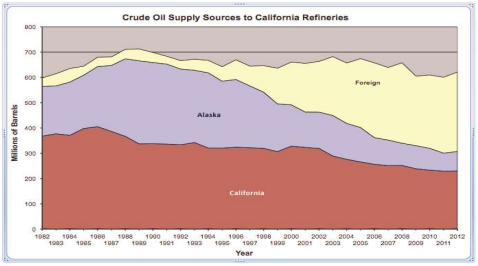


Figure 8 An Increase in Demand in the Short Run and Long Run



Example 1

- *The New York Times* (July 1, 1994) reported on a Clinton administration proposal to lift the ban on exporting oil from the North Slope of Alaska.



Example 1

According to the article, the administration said that "*the chief effect of the ban has been to provide California refiners with crude oil cheaper than oil on the world market. . . . The ban created a subsidy for California refiners that had not been passed on to consumers*."

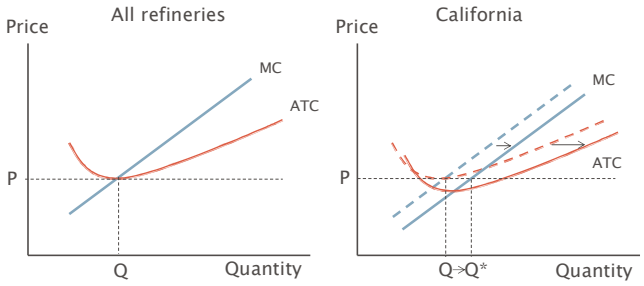
Exmaple 1

- Is the market of oil competitive?
  - One good
  - Common, global market
  - Many producers and buyers

Example 1

- The California refiners have access to inexpensive Alaskan crude oil and that other refiners must buy more expensive crude oil from the Middle East.
  - The cost curves of California refiners will change
  - Lets assume that the costs of other refiners won't change
- California cannot itself supply the entire world market

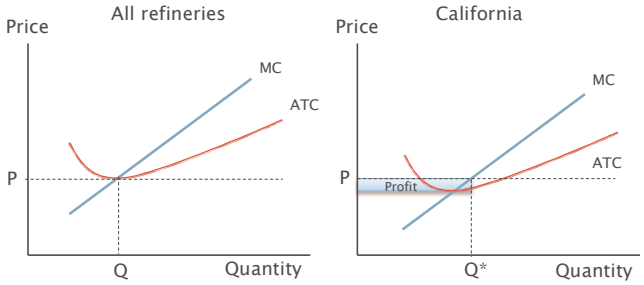
Example 1 – individual supply curves



Example 1 – market prices

- For the same price, the aggregated supply will increase…
- …only slightly, because the share of production from California in a global market is very small. Lets neglect the effect
- It is equivalent to an assumption that all the other refineries are the same. Hence the marginal refinery remains unchanged.

Example 1 – individual profits



Example 1 – conclusions

- The California refiners have positive profits.
- The new regulation creates a subsidy for the California refiners
- The overall price level remain unchanged (or is only slightly affected). The subsidy is not passed on to the consumers.

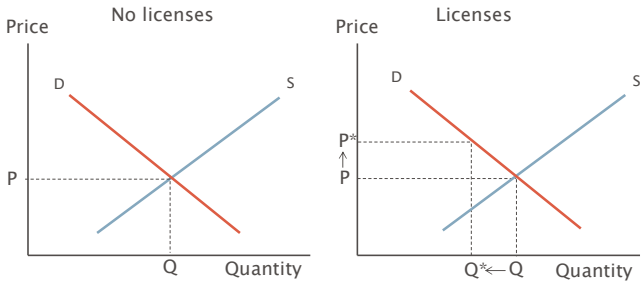
Example 2

- In Italy, there are 25,186 taxis in the country (1 out of 2412 people)
- There is at present time a harsh political struggle between people who advocate deregulation of taxi licenses and those who are against it.
- Taxi fares are generally very high

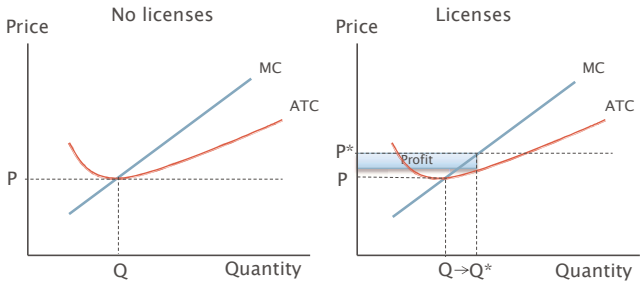
Example 2

- Is the taxi market competitive?
  - Many taxi drivers
  - Many customers
  - Uniform product
  - Prices easy to compare

Example 2 – aggregated supply and demand



Example 2 – individual supply curves



Example 2 – conclusions

- Licenses reduces the supply of taxis…
- …and lead to higher prices
- Due to higher prices, taxi drivers experience positive profits

Summary

- Because a competitive firm is a price taker, its revenue is proportional to the amount of output it produces.
- The price of the good equals both the firm's average revenue and its marginal revenue.

Summary

- To maximize profit, a firm chooses the quantity of output such that marginal revenue equals marginal cost.
- This is also the quantity at which price equals marginal cost.
- Therefore, the firm's marginal cost curve is its supply curve.

Summary

- In the short run, when a firm cannot recover its fixed costs, the firm will choose to shut down temporarily if the price of the good is less than average variable cost.
- In the long run, when the firm can recover both fixed and variable costs, it will choose to exit if the price is less than average total cost.

Summary

- In a market with free entry and exit, profits are driven to zero in the long run and all firms produce at the efficient scale.
- Changes in demand have different effects over different time horizons.
- In the long run, the number of firms adjusts to drive the market back to the zero-profit equilibrium.

Monopoly

Introduction

Monopoly firm

- While a competitive firm is a *price taker*, a monopoly firm is a *price maker*.
- A firm is considered a *monopoly* if . . .
  - it is the sole seller of its product.
  - its product does not have close substitutes
  - there are significant barriers to enter the market.

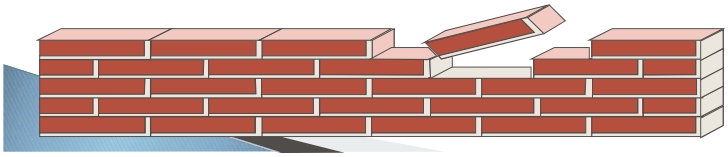
MS Windows example…

- Microsoft has the market power for Windows operating system.
- The market price charged by each legal copy of the Windows operating system exceeds the mariginal costs of production.
- Why the price is not even higher?
- Because people wouldn't buy…
- Although monopolies can control prices of their good, their profits are not unlimited!

Microsoft Windows

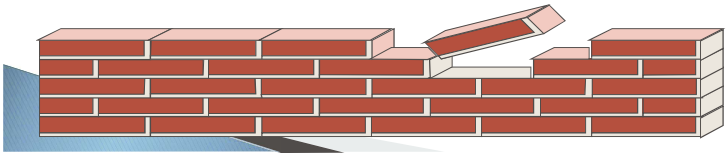
WHY MONOPOLIES ARISE

- The fundamental cause of monopoly is *barriers to entry*.
- Barriers to entry have three sources:
  - Ownership of a key resource.
  - The government gives a single firm the exclusive right to produce some good.
  - Costs of production make a single producer more efficient than a large number of producers.



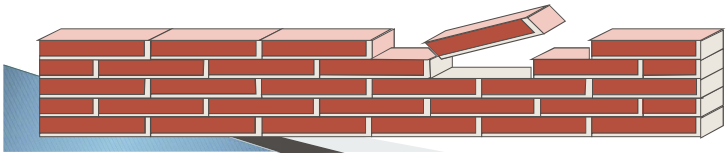
Monopoly Resources

- Although exclusive ownership of a key resource is a potential source of monopoly, in practice monopolies rarely arise for this reason.
- Nowadays, resources are owned by many people.
- Many goods are traded internationally and the scope of their markets is worldwide.



Government-Created Monopolies

- Governments may restrict entry by giving a single firm the exclusive right to sell a particular good in certain markets.
- Patent and copyright laws are two important examples of how government creates a monopoly to serve the public interest.



Natural Monopolies

- An industry is a *natural monopoly* when a single firm can supply a good or service to an entire market at a smaller cost than could two or more firms.
- A *natural monopoly* arises when there are economies of scale over the relevant range of output.

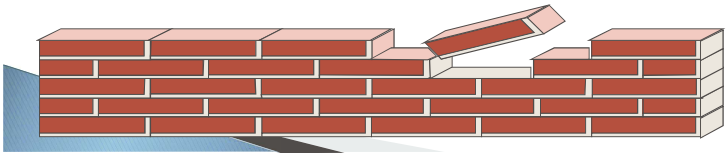
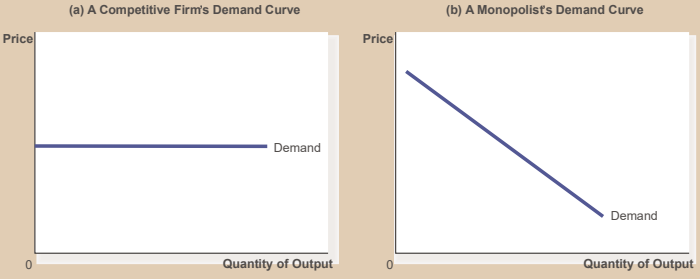


Figure 1 Economies of Scale as a Cause of Monopoly

HOW MONOPOLIES MAKE PRODUCTION AND PRICING DECISIONS

- Monopoly versus Competition
  - Monopoly
    - Is the sole producer
    - Faces a downward-sloping demand curve
    - Is a price maker
    - Reduces price to increase sales
  - Competitive Firm
    - Is one of many producers
    - Faces a horizontal demand curve
    - Is a price taker
    - Sells as much or as little at the same price

Figure 2 Demand Curves for Competitive and Monopoly Firms



De Beers – diamond monopoly

- The company was founded in 1888 by Cecil Rhodes:
  - in 1871, he found a 83.5 carat diamond on Kimberley, South Africa
  - he invested the profits into buying up small mining operators
  - In 1888, he founded De Beers, as a result of merge
  - He was the sole owner of all diamond mining operations in South Africa.

De Beers – diamond monopoly

- In 1889, Rhodes got an agreement with the London-based Diamond Syndicate, which agreed to purchase a fixed quantity of diamonds at an agreed price.
- in 1902, De Beers controlled 90% of the world's diamond production.

DE BEERS
A DIAMOND IS FOREVER

De Beers – diamond monopoly

- "… *the only way to increase the value of diamonds is to make them scarce*, that is to reduce production.…" E. Oppenheimer (later chair of the company)
- It controlled prices by:
  - purchasing and stockpiling diamonds produced by other manufacturers
  - convincing independent producers to join its single channel monopoly
  - flooding the market with diamonds similar to those of producers who refused to join the cartel.

De Beers – diamond monopoly

- The end of the monopoly:
  - In 2000, producers in Russia, Canada and Australia decided to distribute diamonds outside of the De Beers channel.
  - Rising awareness of *blood diamonds* that forced De Beers to limit sales to its own mined products.
  - De Beers' market share fell from 90% in the 1980s to less than 40% in 2012.

Microsoft

Microsoft Windows

- Is a Microsoft truly the monopolist?
  - Large market share

  - Behavel
    - Limits the access to documentation, which enables developing of competitive software
    - Sell jointly Internet Explorer with an operating system
    - Exclusionary agreements

Microsoft

Microsoft Windows

- Microsoft:
  - Settled anti-trust litigation in the U.S. in 2001
  - Fined 493 million euros by the European Commission in 2004
  - Fined 1.35 Billion USD in 2008 for noncompliance with the 2004 rule.
- Is the Microsoft truly the monopolist or very strong competitor?

Other monopolists

- Polish mail (Poczta Polska)
- Deutsche Telekom: former state monopoly, still partially state owned, currently monopolizes high-speed VDSL broadband network
- Warsaw underground

POCZTA POLSKA

Deutsche Telekom

Demand and marginal revenue

Decision process

A Monopoly's Revenue

- Total Revenue

$$TR = P(Q) \cdot Q$$

- Average Revenue

$$AR = \frac{TR}{Q} = P(Q)$$

- Marginal Revenue

$$MR = \frac{\partial TR}{\partial Q}$$

Table 1 A Monopoly's Total, Average, and Marginal Revenue

Quantity of Water (Q)	Price (P)	Total Revenue (TR = P × Q)	Average Revenue (AR = TR/Q)	Marginal Revenue (MR = ΔTR/ΔQ)
0 gallons	$11	$ 0	?	?
1	10	10		
2	9	18		
3	8	24		
4	7	28		
5	6	30		
6	5	30		
7	4	28		
8	3	24		

Table 1 A Monopoly's Total, Average, and Marginal Revenue

Quantity of Water (Q)	Price (P)	Total Revenue (TR = P × Q)	Average Revenue (AR = TR/Q)	Marginal Revenue (MR = ΔTR/ΔQ)
0 gallons	$11	$ 0	—	
				$10
1	10	10	$10	
				8
2	9	18	9	
				6
3	8	24	8	
				4
4	7	28	7	
				2
5	6	30	6	
				0
6	5	30	5	
				−2
7	4	28	4	
				−4
8	3	24	3	

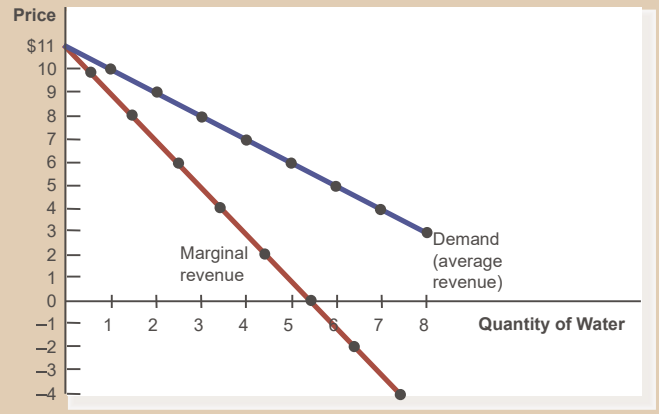
A Monopoly's Revenue

- A Monopoly's Marginal Revenue
  - A monopolist's marginal revenue is always *less than* the price of its good.
    - The demand curve is downward sloping.
    - When a monopoly drops the price to sell one more unit, the revenue received from previously sold units also decreases.

A Monopoly's Revenue

- A Monopoly's Marginal Revenue
  - When a monopoly increases the amount it sells, it has two effects on total revenue ($P \times Q$).
    - The output effect—more output is sold, so Q is higher.
    - The price effect—price falls, so P is lower.

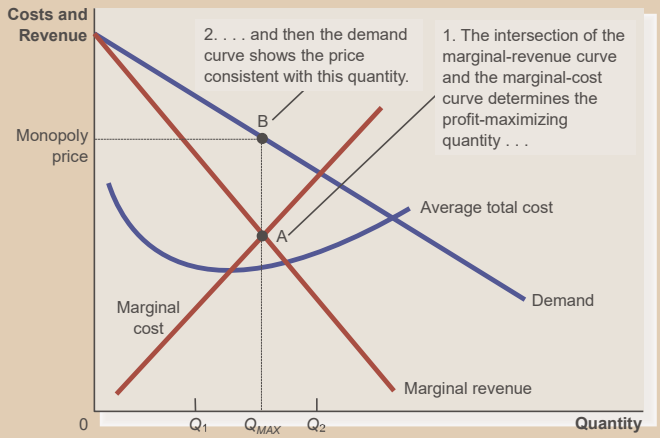
Figure 3 Demand and Marginal-Revenue Curves for a Monopoly



Profit Maximization

- A monopoly maximizes profit by producing the quantity at which marginal revenue equals marginal cost.
- It then uses the demand curve to find the price that will induce consumers to buy that quantity.

Figure 4 Profit Maximization for a Monopoly



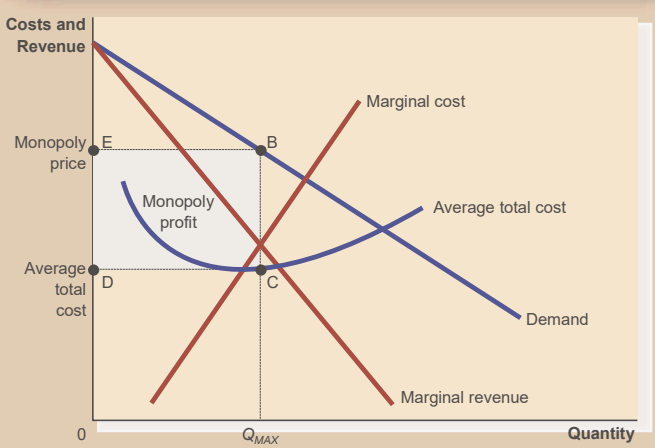
Profit Maximization

- Comparing Monopoly and Competition
  - For a competitive firm, price equals marginal cost.
    $$P = MR = MC$$
  - For a monopoly firm, price exceeds marginal cost.
    $$P > MR = MC$$

A Monopoly's Profit

- Profit equals total revenue minus total costs.
  - Profit = $TR - TC$
  - Profit = $(TR/Q - TC/Q) \times Q$
  - Profit = $(P - ATC) \times Q$

Figure 5 The Monopolist's Profit



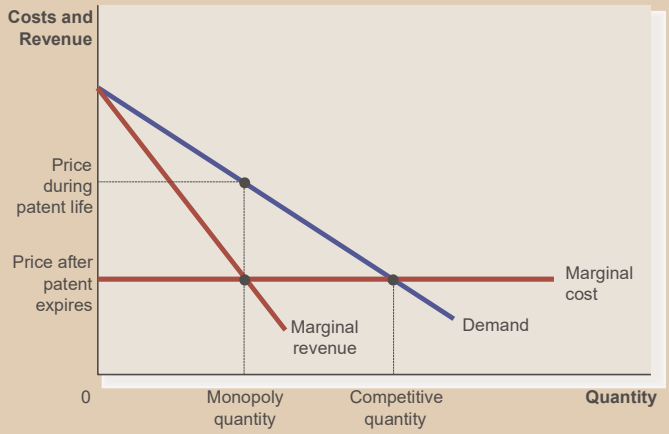
A Monopolist's Profit

- The monopolist will receive economic profits as long as price is greater than average total cost.

Pharmaceutical drugs

- Two type of market structures observed:
  - Monopoly: patent laws give the monopoly on sale drugs for some time
  - Competition: when the patent runs out, any firm may produce and sell the drug
- During the life of the patent the price is above the marginal cost
- When the patent runs out, new firms enter the market and the price falls

Figure 6 The Market for Drugs



Example 3

Suppose, a company is a monopolist and faces the downward sloping demand curve

$$P_D = 100 - 2Q$$

The company has the following cost structure

$$TC = 10 + 40Q + Q^2$$

How much will the firm produce? At what cost and price? What are the firm profits?

Public policy toward monopolies

Market regulations

PUBLIC POLICY TOWARD MONOPOLIES

- Government responds to the problem of monopoly in one of four ways.
  - Making monopolized industries more competitive.
  - Regulating the behavior of monopolies.
  - Turning some private monopolies into public enterprises.
  - Doing nothing at all.

Increasing Competition with Antitrust Laws

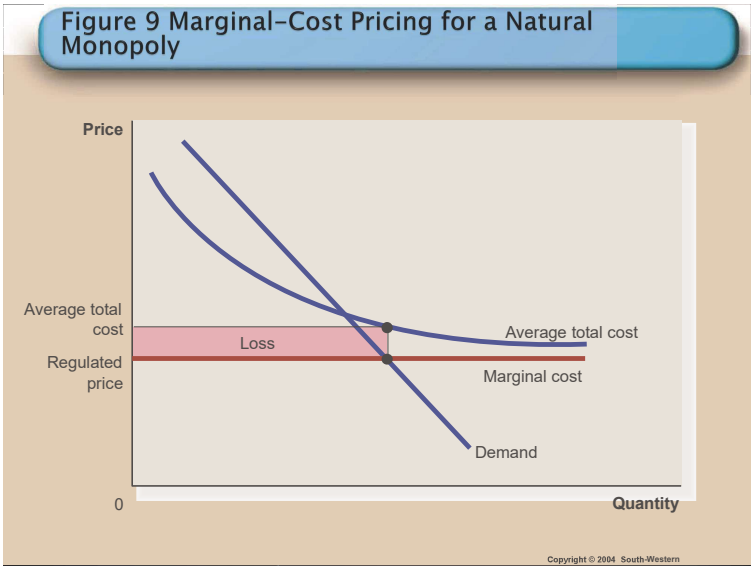
- Antitrust laws are a collection of statutes aimed at curbing monopoly power.
- Antitrust laws give government various ways to promote competition.
  - They allow government to prevent mergers.
  - They allow government to break up companies.
  - They prevent companies from performing activities that make markets less competitive.

Antitrust laws

- Prevent mergers: Microsoft and Intuit in 1994.
- Breaks up companies:
  - Polish railways (PKP) were divided into a set of smaller companies (2001)
  - AT&T telecommunications company was divided into 8 smaller companies (1984)
- Prevents companies from performing activities that make markets less competitive.

Regulation

- Government may regulate the prices that the monopoly charges.
  - The allocation of resources will be efficient if price is set to equal marginal cost.
- When the company is a natural monopoly than it has a decreasing average cost then
  - AC>MC
  - The firm will exit the market (suffers losses)



Regulation

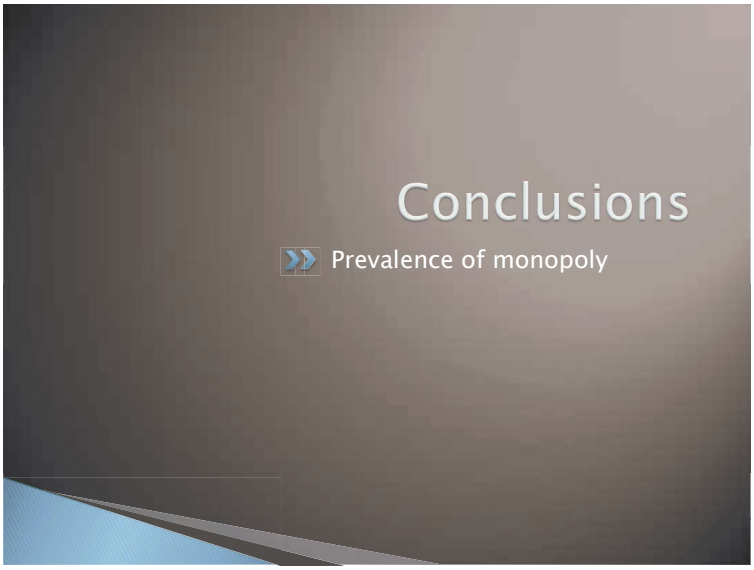
- In practice, regulators will allow monopolists to keep some of the benefits from lower costs in the form of higher profit, a practice that requires some departure from marginal-cost pricing.
- Examples:
  - Electricity prices
  - Gas prices

Public Ownership

- Rather than regulating a *natural monopoly* that is run by a private firm, the government can run the monopoly itself.
- Examples:
  - Railway trucks
  - Postal Services

Doing Nothing

- Government can do nothing at all if the market failure is deemed small compared to the imperfections of public policies.



CONCLUSION: THE PREVALENCE OF MONOPOLY

- How prevalent are the problems of monopolies?
  - Monopolies are common.
  - Most firms have some control over their prices because of differentiated products.
  - Firms with substantial monopoly power are rare.
  - Few goods are truly unique.

Summary

- A monopoly is a firm that is the sole seller in its market.
- It faces a downward-sloping demand curve for its product.
- A monopoly's marginal revenue is always below the price of its good.

Summary

- Like a competitive firm, a monopoly maximizes profit by producing the quantity at which marginal cost and marginal revenue are equal.
- Unlike a competitive firm, its price exceeds its marginal revenue, so its price exceeds marginal cost.

Summary

- A monopolist's profit-maximizing level of output is below the level that maximizes the sum of consumer and producer surplus.
- A monopoly causes deadweight losses similar to the deadweight losses caused by taxes.

Summary

- Policymakers can respond to the inefficiencies of monopoly behavior with antitrust laws, regulation of prices, or by turning the monopoly into a government-run enterprise.
- If the market failure is deemed small, policymakers may decide to do nothing at all.

Summary

- Monopolists can raise their profits by charging different prices to different buyers based on their willingness to pay.
- Price discrimination can raise economic welfare and lessen deadweight losses.