Monopoly

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Introduction

- A **monopoly** is a firm that is the sole seller of a product <u>without close substitutes</u>.

  - Example: BC Hydro

- The key difference between monopoly and perfect competition:
  A monopoly firm has **market power**, the ability to influence the market price of the product it sells.
  A competitive firm has no market power. It's a price taker.

Why Monopolies Arise

The main cause of monopolies is **barriers to entry** – other firms cannot enter the market.

Three sources of barriers to entry:

1. A single firm owns a key resource.

   E.g., De Beers owns most of the world's diamond mines

2. The govt gives a single firm the exclusive right to produce the good.

   E.g., patents, copyright laws

Why Monopolies Arise

3. **Natural monopoly**: a single firm can produce the entire market **Q** at lower cost than could several firms.

Example: 1000 homes need electricity

ATC is lower if one firm services all 1000 homes than if two firms each service 500 homes because of IRS.

Electricity

Cost

ATC slopes downward due to huge *FC* and small *MC*

$80

$50

ATC
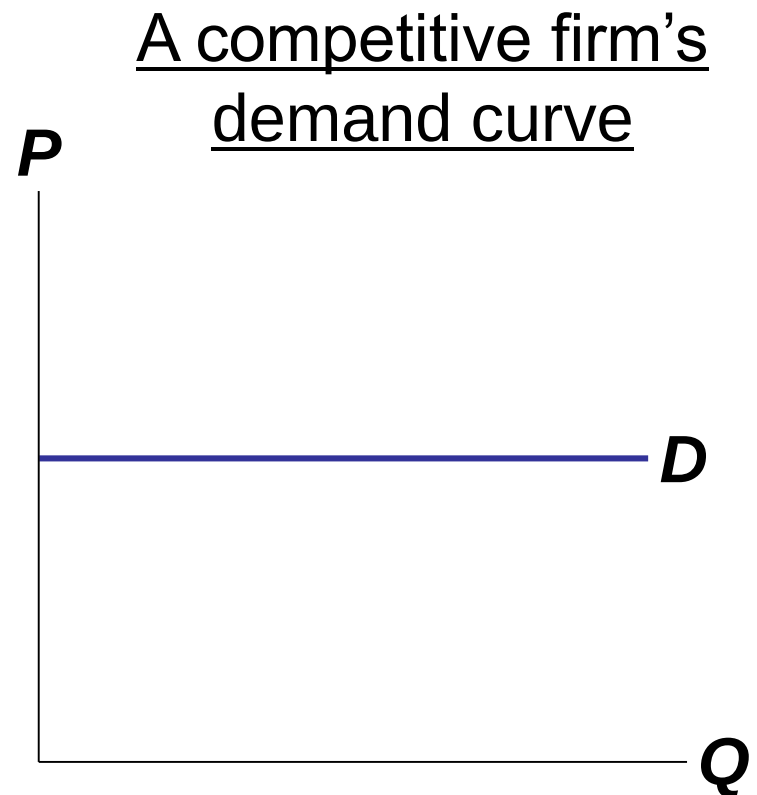
Q

500   1000
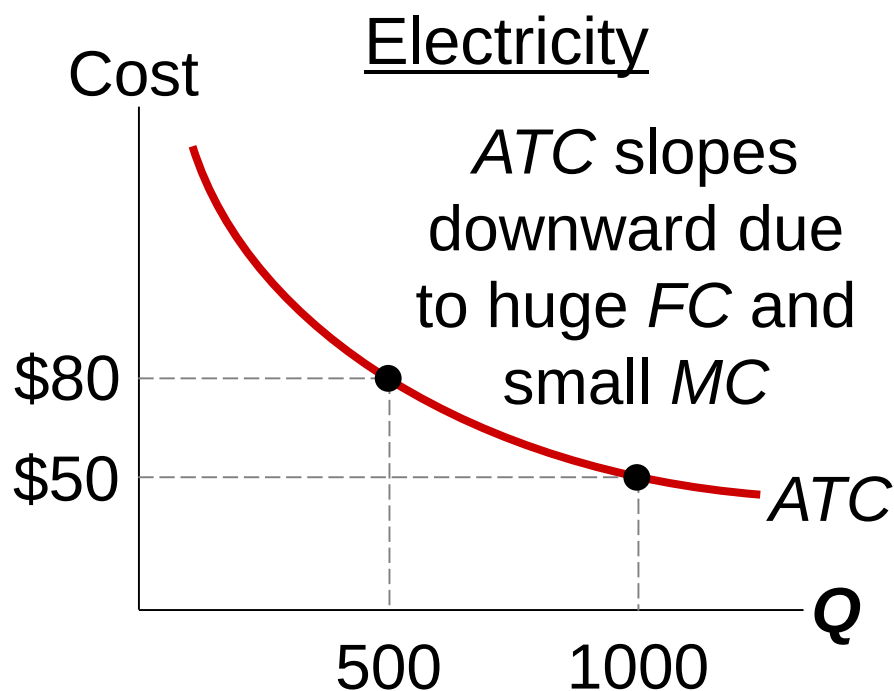
Monopoly vs. Competition: Demand Curves

In a competitive market, the <u>market demand curve</u> slopes downward.

But the <u>demand curve faced by any individual firm</u> is horizontal at the market price.

The firm can increase **Q** without lowering **P**,

so $MR = P$ for the competitive firm.

<u>A competitive firm's demand curve</u>

P

D

Q

How Does A Monopolist Set the Price?

Two types of Pricing policies:

1. Same price to all consumers (linear pricing)

2. Price discriminations: Set difference prices to different consumers or different groups of consumers.

In the following slides before we discuss the price discriminations, we assume the linear pricing is used.
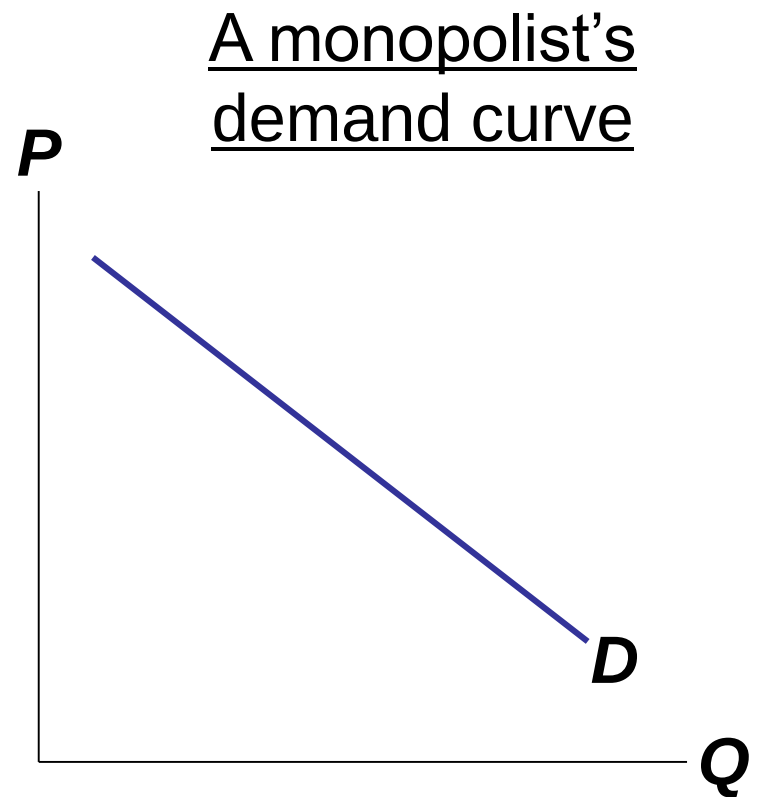
Monopoly vs. Competition: Demand Curves

A monopolist is the only seller, so it faces the market demand curve.

It can set the value of one and only one of the two variables: price and quantity, and the value of another one is determined by the market.

To sell a larger **Q**, the firm must reduce **P**.

Thus, *MR* ≠ **P**.

A monopolist's demand curve

P

D

Q

ACTIVE LEARNING 1
A monopoly's revenue

Common Grounds is the only seller of cappuccinos in town.

The table shows the market demand for cappuccinos.

Fill in the missing spaces of the table.

What is the relation between **P** and **AR**? Between **P** and **MR**?

Q	P	TR	AR	MR
0	$4.50		n.a.	
1	4.00			
2	3.50			
3	3.00			
4	2.50			
5	2.00			
6	1.50			

ACTIVE LEARNING 1
Answers

Here, **P** = **AR**, same as for a competitive firm.

Here, **MR** < **P**, whereas **MR** = **P** for a competitive firm.

Q	P	TR	AR	MR
0	$4.50	$ 0	n.a.	
1	4.00	4	$4.00	$4
2	3.50	7	3.50	3
3	3.00	9	3.00	2
4	2.50	10	2.50	1
5	2.00	10	2.00	0
6	1.50	9	1.50	–1

Common Grounds' D and MR Curves

Q	P	MR
0	$4.50	░░░
		$4
1	4.00	
		3
2	3.50	
		2
3	3.00	
		1
4	2.50	
		0
5	2.00	
		−1
6	1.50	░░░

P, MR

$5

4

3 Demand curve (**P**)

2

1

0

-1 **MR**

-2

-3

0 1 2 3 4 5 6 7 **Q**
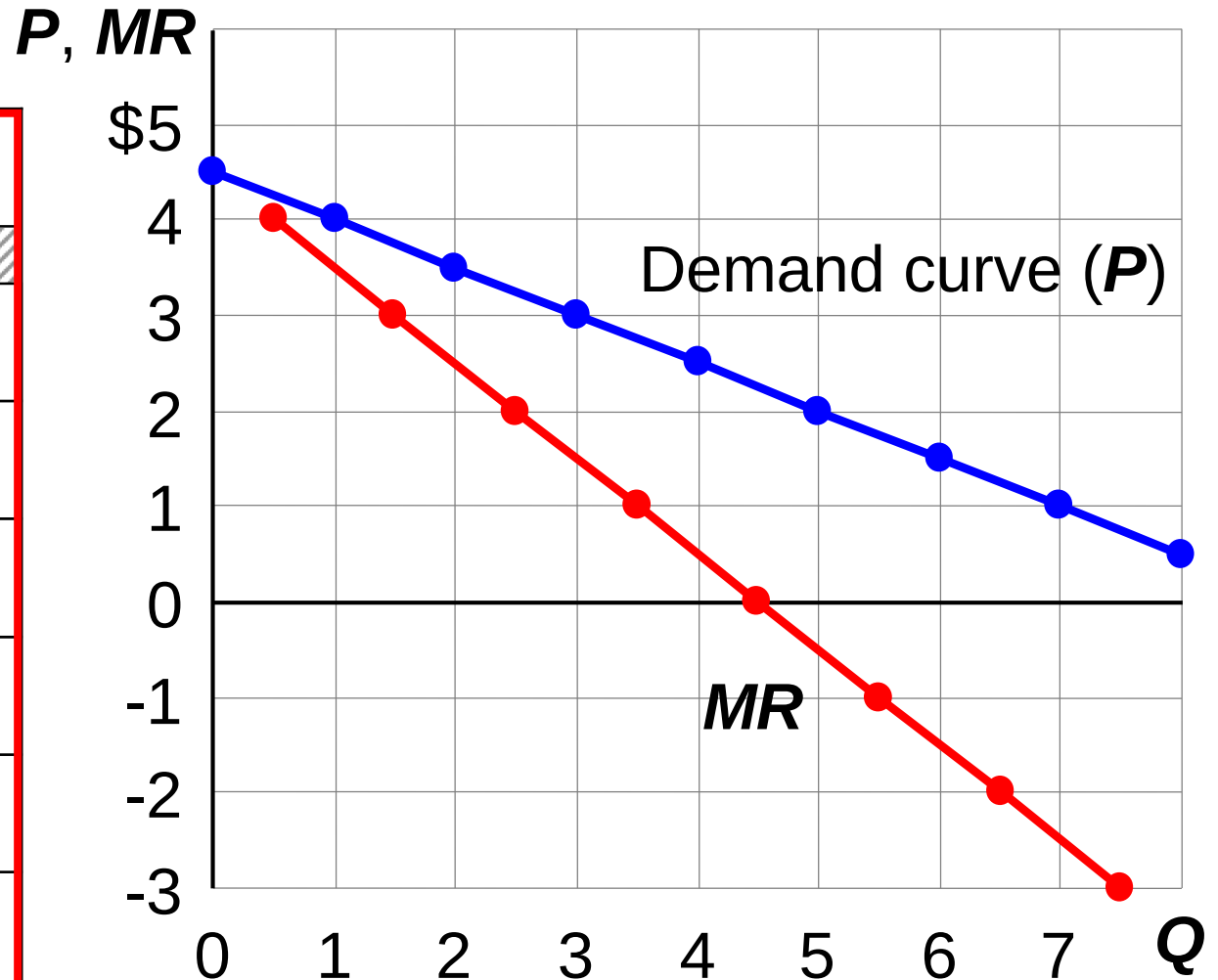
Understanding the Monopolist's MR

- Increasing **Q** has two effects on revenue:
    - ***Output effect***: higher output raises revenue
    - ***Price effect***: lower price reduces revenue

- To sell a larger **Q**, the monopolist must reduce the price on all the units it sells.

- Hence, **P > MR**

- *MR* could even be negative if the price effect exceeds the output effect (*e.g.*, when Common Grounds increases **Q** from 5 to 6).

- Note that a competitive firm has the output effect but not the price effect: the competitive firm does not need to reduce its price in order to sell a larger quantity, so, for the competitive firm, P = MR.

Understanding the Monopolist's MR

- $MR = \frac{\Delta R}{\Delta Q} = \frac{\Delta(P(Q)Q)}{\Delta Q} = P + \frac{\Delta P}{\Delta Q}Q = P +$ $slope\ of\ demand\ function * Q$

- $MR = P + \frac{\Delta P}{\Delta Q}Q = P + \frac{P}{\frac{\Delta Q}{\Delta P}\frac{P}{Q}} = P - \frac{P}{\epsilon_p} = P(1 - \frac{1}{\epsilon_p})$

- So $MR < P$

Profit-Maximization

- Like a competitive firm, a monopolist maximizes profit by producing the quantity where **MR = MC**.

- Once the monopolist identifies this quantity, it sets the highest price consumers are willing to pay for that quantity.

- It finds this price from the **D** curve.

Profit-Maximization

1. The profit-maximizing **Q** is where $MR = MC$.

2. Find **P** from the demand curve at this **Q**.

Costs and Revenue

P

MC

D

MR

Q   Quantity

Profit-maximizing output
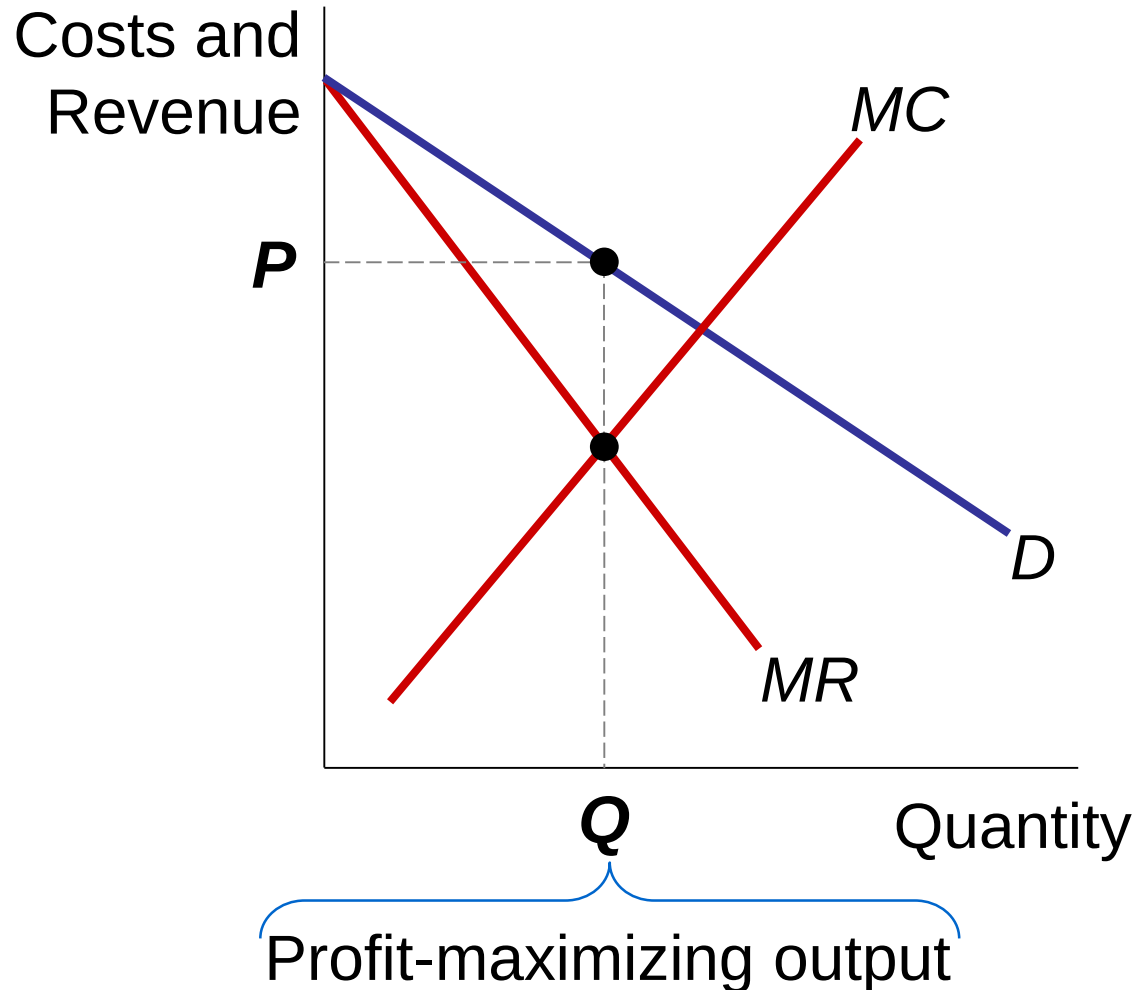
The Monopolist's Profit

As with a competitive firm, the monopolist's profit equals

(**P** − **ATC**) x **Q**

A perfectly competitive industry can have profits in the short run but not in the long run. But barriers to entry allow a monopolist to make profits in both the short run and the long run.
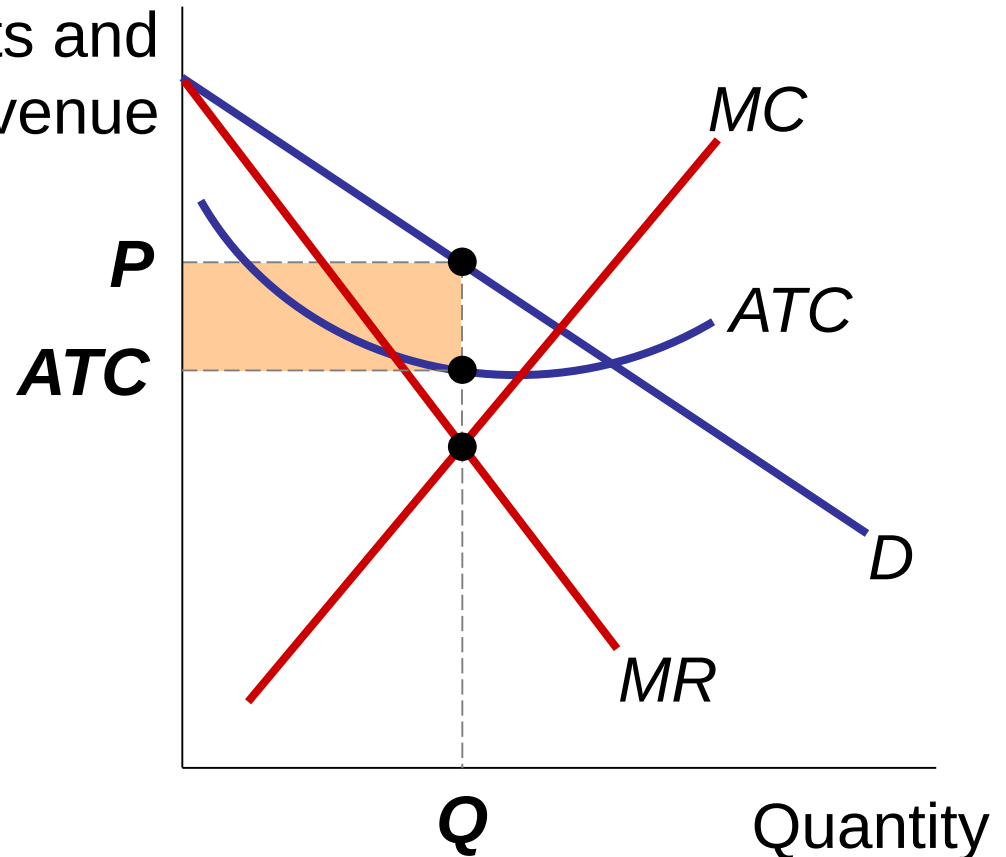
Understanding the Monopolist's MR

- The mark-up $= \frac{P}{MC} - 1 = \frac{P}{MR} - 1 = \frac{P}{P\left(1 - \frac{1}{\epsilon_p}\right)} - 1 = \frac{1}{\epsilon_p - 1}$.

- The price mark-up can be used to measure the power of the monopolist.

- When demand is perfectly elastic, the demand curve is horizontal, and the mark-up is 0.

- The less elastic the demand (up to unitary elasticity), the higher the price mark-up.

- The monopolist only chooses to sell when demand is elastic ($\epsilon_p > 1$). (That is, price on the upper half of the linear demand curve .) Why?

A Monopoly Does Not Have an S Curve

Remember that a supply curve shows the quantity that producers are willing to supply for any given market price.

A competitive firm

- takes P as given
- has a supply curve that shows how its Q depends on P.

A monopoly firm

- is a "price-maker," not a "price-taker"
- chooses a profit-maximizing quantity, taking into account its own ability to influence the price.
- Q does not depend on P;
  rather, Q and P are jointly determined by
  MC, MR, and the demand curve.

So there is no supply curve for monopoly.
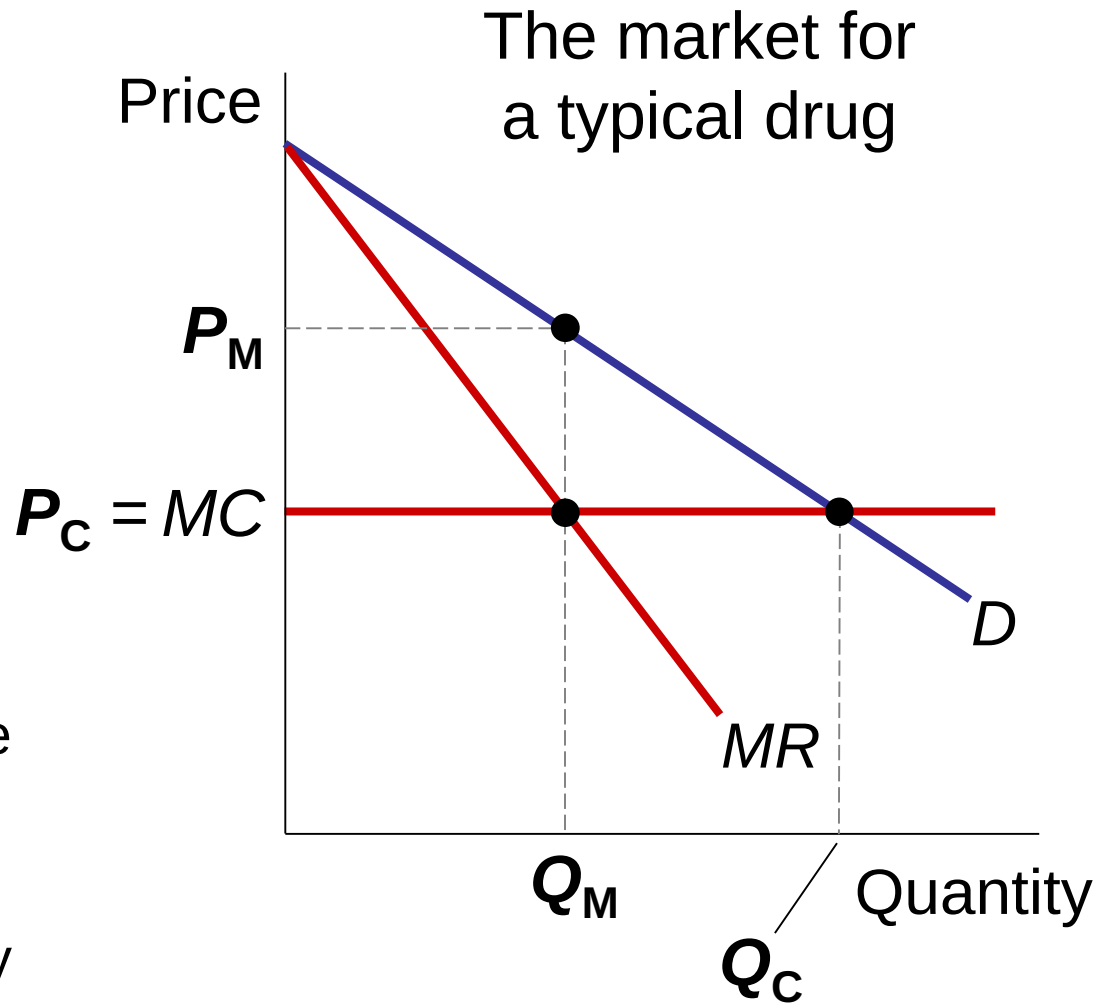
CASE STUDY: Monopoly vs. Generic Drugs

Patents on new drugs give a temporary monopoly to the seller.

When the patent expires, the market becomes competitive, generics appear.

A monopolist:

- Produces a smaller quantity
- Charges a higher price
- Earns a profit

Note: we assume constant MC for simplicity

The market for a typical drug

Price

P_M

$P_C = MC$

D

MR

Q_M Quantity

Q_C

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The Welfare Cost of Monopoly

- Recall: In a competitive market equilibrium, $P = MC$ and total surplus is maximized.

- In the monopoly eq'm, $P > MR = MC$
  - The value to buyers of an additional unit (P) exceeds the cost of the resources needed to produce that unit (MC).
  - The monopoly Q is too low – could increase total surplus with a larger Q.
  - Thus, monopoly results in a deadweight loss.

The Welfare Cost of Monopoly

Competitive equilibrium:
  quantity = Q_C, $P = MC$
  total surplus is maximized

Monopoly equilibrium:
  quantity = Q_M, $P > MC$

Monopoly changes the way the economic "pie" is divided: by charging higher prices, the monopoly gets more surplus and consumers get less surplus.

Monopoly also reduces the size of the economic pie – by producing less than the socially efficient quantity and causing a deadweight loss.

Price

Deadweight loss

MC

P

P = MC

MC

D

MR

Q_M Q_C Quantity
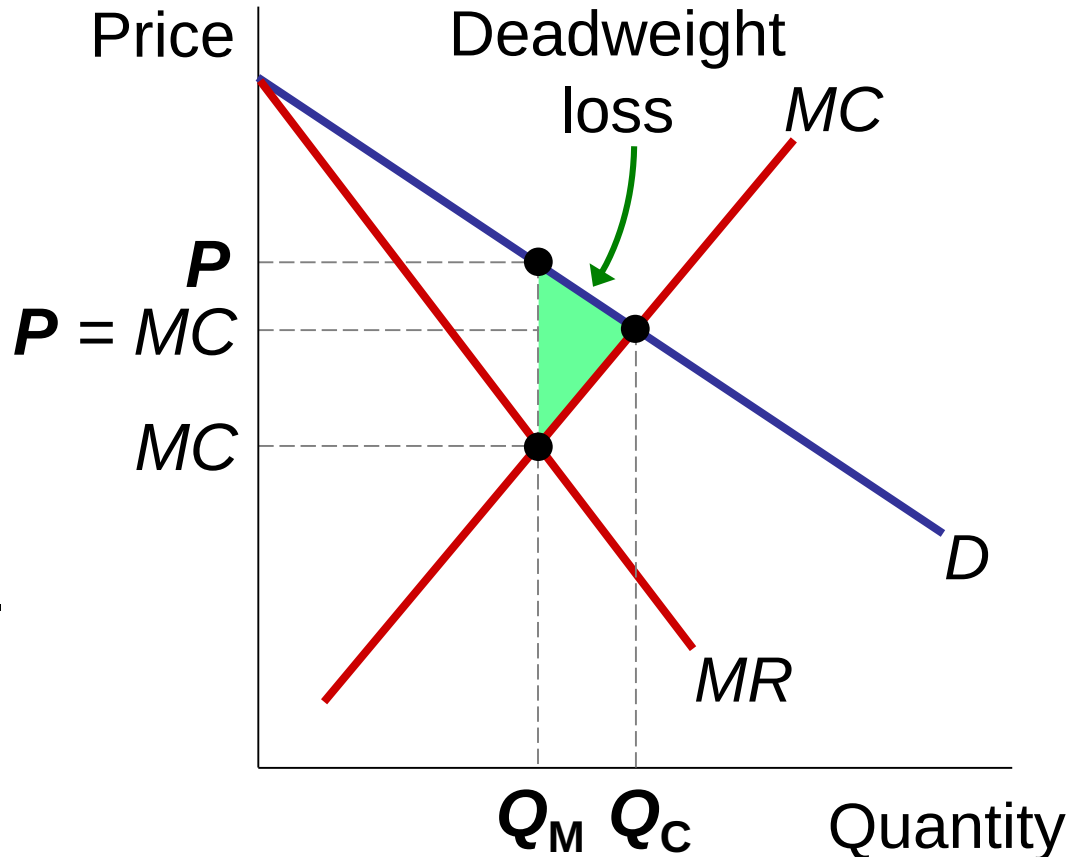
Price Discrimination

- Up to this point, we have considered only the case of a single-price monopolist, one that charges all customers the same price.

- But not all monopolists do this. In fact, many if not most monopolists find that they can increase their profits by charging different prices to different buyers for the same good, which is called **Price discrimination**.

- The characteristic used in price discrimination is willingness to pay (WTP):
  - A firm can increase profit by charging a higher price to buyers with higher WTP (i.e. by distinguishing between the groups on the basis of their sensitivity to the price – their price elasticity of demand).
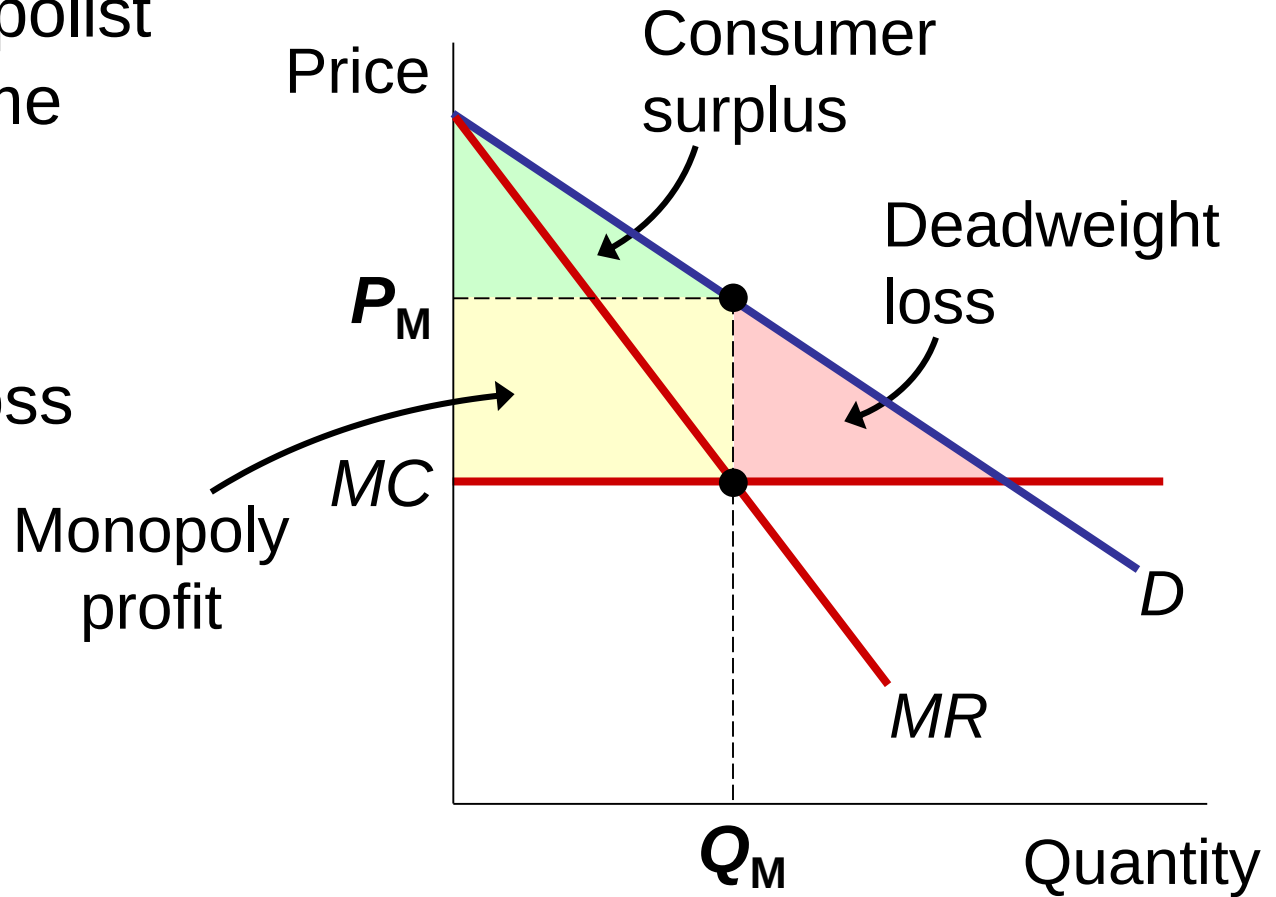
First Degree Price Discrimination

- Also called Perfect Price Discrimination

- Charge each customer the maximum price that customer is willing to pay for each unit sold.

- But difficult to achieve: knowledge of WTP

Perfect Price Discrimination vs. Single Price Monopoly

Here, the monopolist charges the same price (**P_M**) to all buyers.

A deadweight loss results.

Price

Consumer surplus

Deadweight loss

P_M

MC

Monopoly profit

D

MR

Q_M   Quantity

Perfect Price Discrimination vs. Single Price Monopoly

Here, the monopolist produces the <u>competitive</u> quantity, but charges each buyer his or her WTP.

There is no horizontal price line. The "price line" is the demand curve. This is called **perfect price discrimination**. The monopolist captures all CS as profit. But there's no DWL.

This helps explain why government policies on monopoly typically focus on preventing DWL, not preventing price discrimination—unless it causes serious issues of equity.

Price

Monopoly profit

MC

D

MR

Quantity

Q
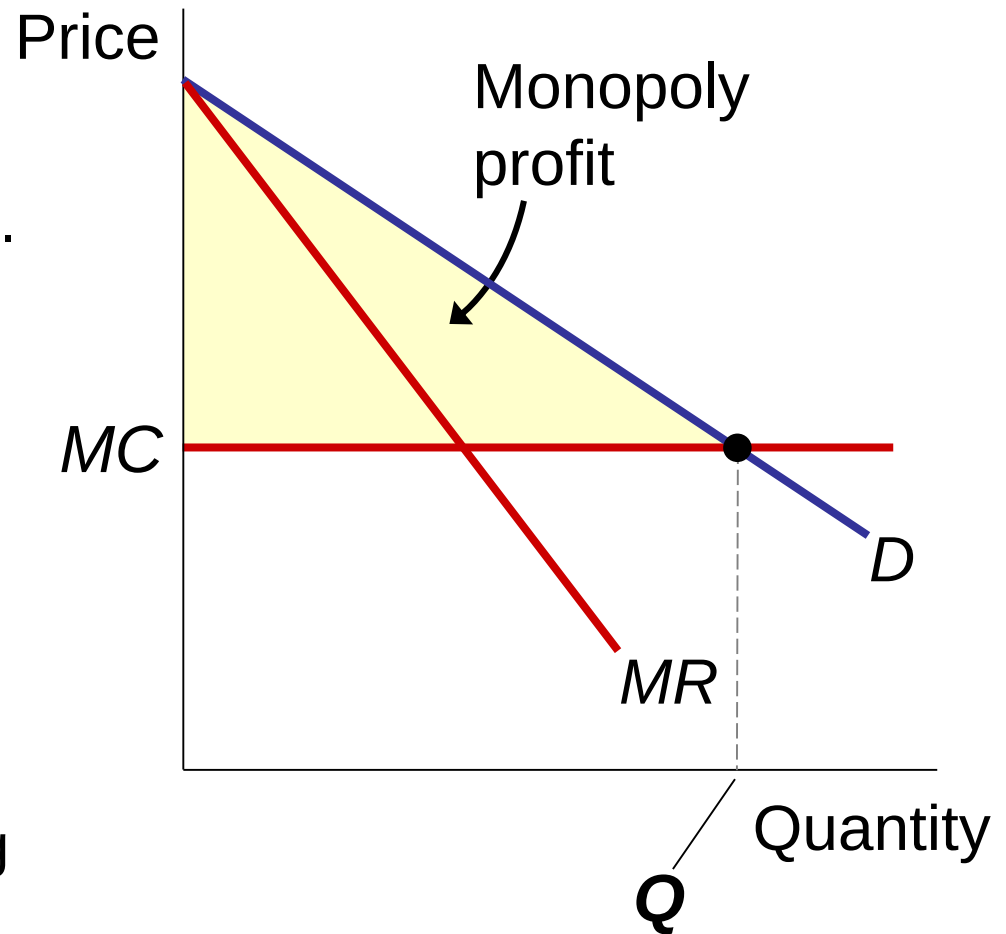
Second Degree Price Discrimination

- Volume discount or Wholesale Pricing

- The more a consumer buys, the lower price he receives for each unit.

- Examples

Third Degree Price Discrimination

- *Segment the market* into two or more groups with separate demand curves, and charge the members of each group the same price, but members of different groups different prices.

- This is the most common version of price discrimination (haircuts, air fares, different prices in different regions).

- The higher price is charged to the consumers with the lower demand elasticity

- Need to prevent arbitrage .

How Much More Expensive Are Drugs Compared to Prices in Australia?

A monopolist will maximize profits by charging a higher price in the country with a lower price elasticity (the rich country) and a lower price in the country with a higher price elasticity (the poor country).

Interestingly, drug prices can differ substantially even among countries with comparable income levels. How do we explain this?
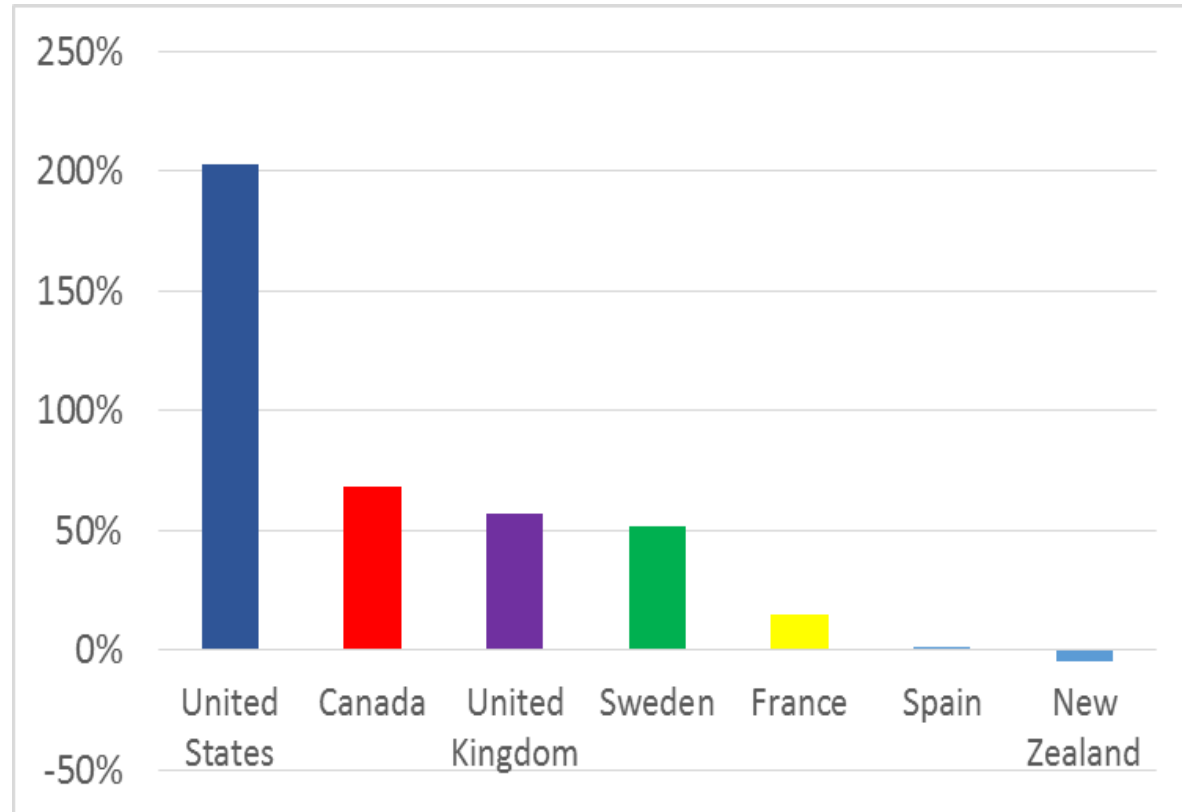
Examples of Price Discrimination

Movie tickets
   Discounts for seniors, students, and people who can attend during weekday afternoons. They are all more likely to have lower WTP than people who pay full price on Friday night.

Airline prices
   Often a flight from one major destination to another – say, from Chicago to Los Angeles - is cheaper than a much shorter flight to a smaller city – say, from Chicago to Salt Lake City. The reason is a difference in the price elasticity of demand: customers have a choice of many airlines between Chicago and Los Angles, so the demand for any one flight is quite elastic.

Examples of Price Discrimination

Discount coupons

People who have time to clip and organize coupons are more likely to have lower income and lower WTP than others.

Need-based financial aid

Low income families have lower WTP for their children's college education. Schools price-discriminate by offering need-based aid to low income families.

Examples of Price Discrimination

Quantity discounts

A buyer's WTP often declines with additional units, so firms charge less per unit for large quantities than small ones.

Example: A movie theater charges $4 for a small popcorn and $5 for a large one that's twice as big.

Two-Part Tariffs

Another way of extracting consumer surplus:

- Charge an up-front/membership fee T and then charge a further per-unit price P for usage

* The monopolist will set T and P such that the producer surplus is maximized.

Examples? Costco membership, Ink-jet printers.

Two-Part Tariffs

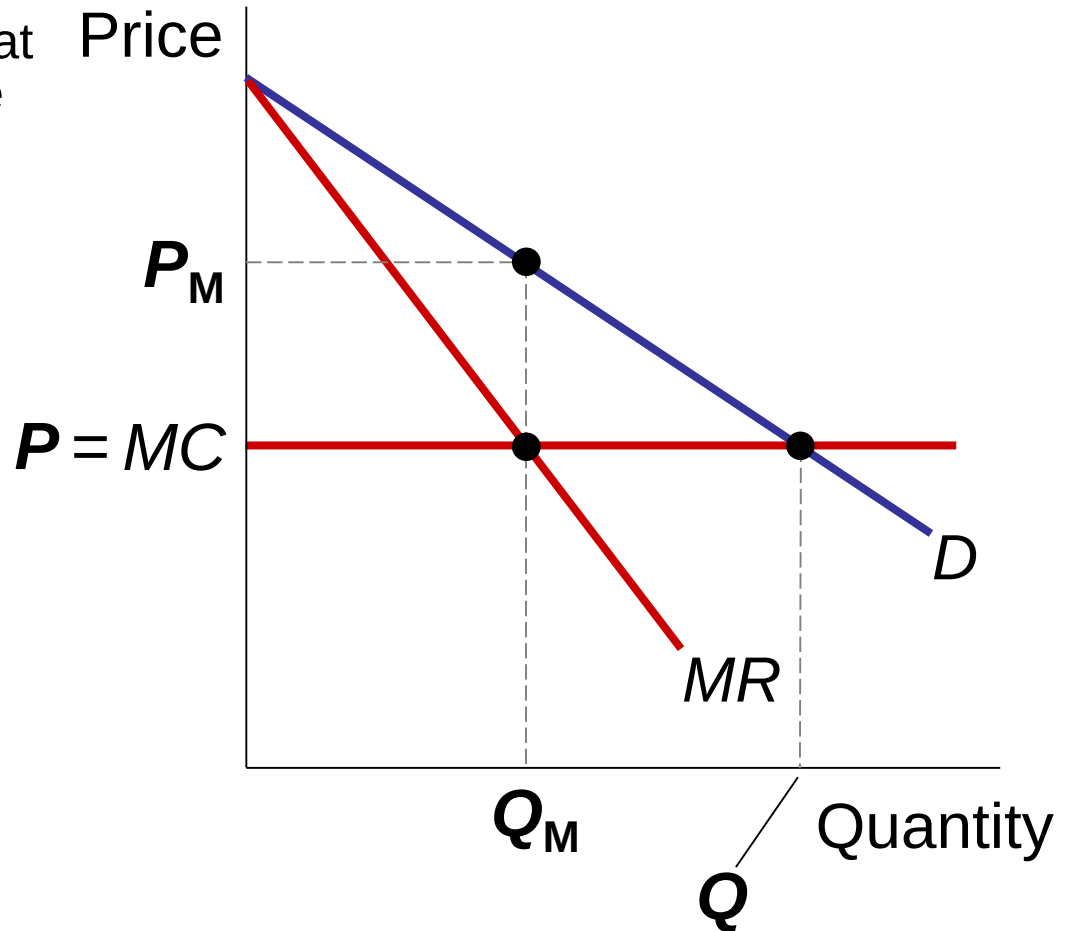T = area of the triangle that is below the demand curve and above the MC curve.

$P = MC$

CS = 0

PS = total possible surplus

Profit = PS - FC

Market is efficient, DWL=0

Public Policy Toward Monopolies

- Increasing competition with antitrust laws
  - Ban some anticompetitive practices, allow govt to break up monopolies.
  - *E.g*., Sherman Antitrust Act (1890), Clayton Act (1914)

- Regulation
  - Govt agencies set the monopolist's price.
  - For natural monopolies, *MC < ATC* at all **Q**, so marginal cost pricing would result in losses.
  - If so, regulators might subsidize the monopolist or set **P** = *ATC* for zero economic profit.

Is Monopoly Good or Bad?

- Resource allocation
  - DWL is a waste of the society (efficiency)
  - CS is lower (equity)

- Growth
  - The monopoly profit gives firms strong incentives to innovate.

- Market failure?

Public Policy Toward Monopolies

- Public ownership
    - Example: U.S. Postal Service
    - Problem: Public ownership is usually less efficient since no profit motive to minimize costs

- Doing nothing
    - The foregoing policies all have drawbacks, so the best policy may be no policy.