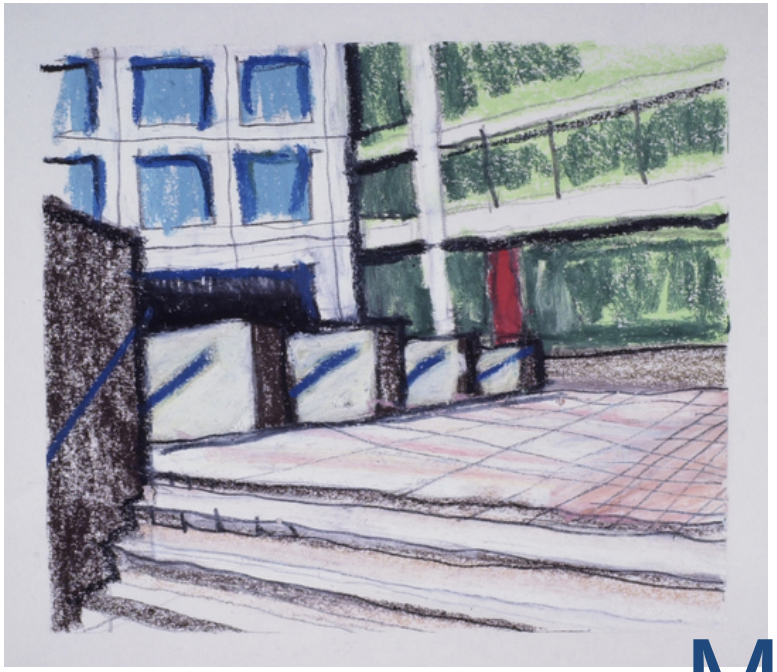


Monopoly

Fei DING
HKUST ECON

Announcements

- Assigned reading:
  - Textbook, Chapter 13, 15
- Problem set 7
  - Ch12: 2-9, 14, 15, 17, 18
  - Ch13: 2-9, 12-16
  - Due date will be announced on CANVAS.

Revisit: Perfect Competition

- Characteristics of perfect competition:
  - Many buyers and sellers
  - One homogeneous product
  - Voluntary exchange/participation
  - Full information
- Competition will be “imperfect” if one or more of these features (assumptions) is violated, or we call it
- **Imperfect Competition, imperfect market.**

Revisit: Perfect Competition

Various forms of imperfect competition:

- Monopoly (one seller)
  - De Beers Diamonds
- Duopoly (two dominant firms)
  - Soft drinks: Coke and Pepsi
  - Credit Cards: Visa and MasterCard
- Oligopoly (a few firms)
  - Automobile: Honda, Toyota, Chrysler, Ford GM

Revisit: Perfect Competition

Various forms of imperfect competition:

- Monopolistic Competition (many firms with slightly differentiated products)
  - Restaurants, hair stylists, etc.

Revisit: Perfect Competition

- Perfect competitive firms are price-takers, or without "**market power**".
  - If a competitive firm charges above the market price, it will lose all its customers.
- A firm having market power means:
- **It can raise its prices without losing all its customers.**
- How can this happen?
  - When no other firm is producing the same product or no perfect/close substitutes.

Revisit: Perfect Competition

- Firms with market power are "price-setters":
  - They can choose prices that maximize their profit.
- Monopoly that has (some) information about the **WTP** of different customers can even practice "**price-discrimination**":
  - Charging different prices to buyers (with different WTP)!

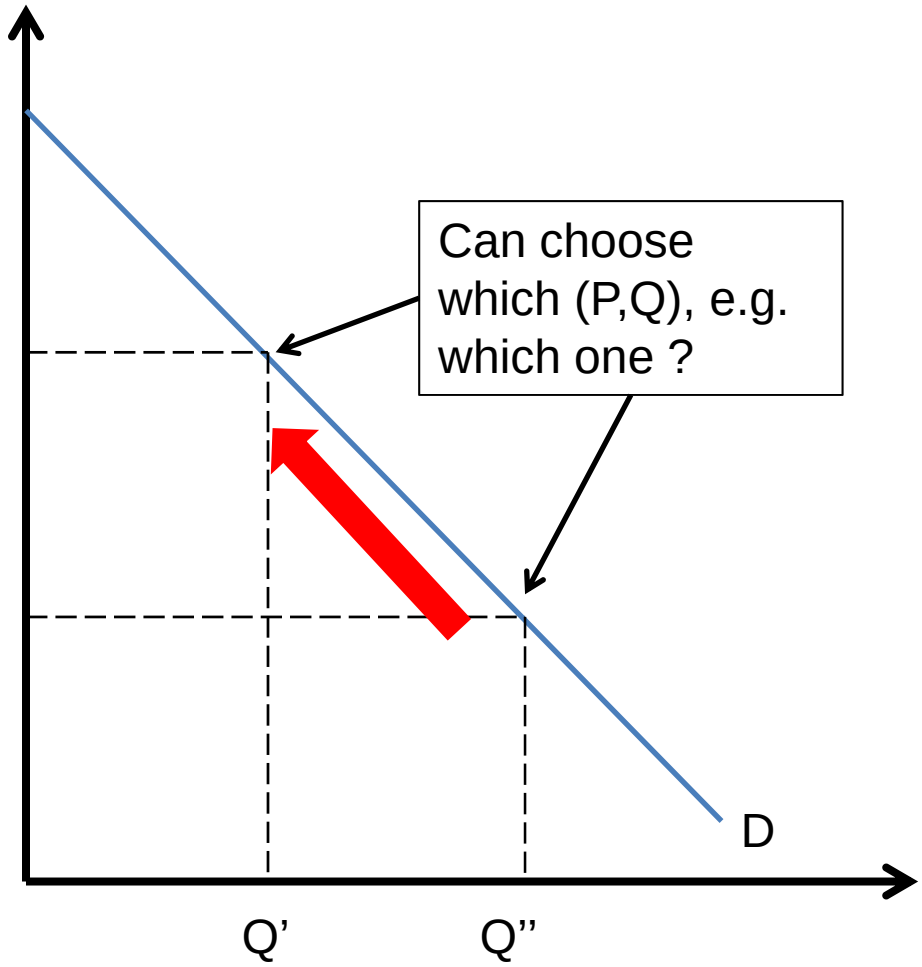
MONOPOLY

Monopoly

- A firm is a "**monopoly**" when it is the only firm producing a given product without close substitutes.
- Since the monopoly is the only firm in the market, it faces the market demand curve (by itself).
  - A competitive firm's demand is perfect elastic (horizontal line at market equilibrium price).
- Given its "superior position", what advantages can a monopoly enjoy?

Monopoly

- If the monopoly wants, it can create "artificial scarcity" by restricting its production to **Q'**, for example,
- Such that, the monopoly can move up the demand curve and charge a higher price.
- **IF it can bring more profit to the monopoly.**



Monopolistic Trade-off

- A monopoly can choose its “Profit-Maximizing” Q.
- **However, market demand curve put RESTRICTIONS on how much a monopoly can charge for a particular Q level.**
- If monopoly wants to sell more, P must be reduced!!! (**Diminishing WTP of buyers or the Law of Demand**)
  - Higher output raises revenue.
  - Lower price reduces revenue.

What makes a monopoly?

- Different from perfect competition, where firms can enter and exit freely,
- There exist “barriers to entry” for a monopoly to appear.
  - Monopoly resources
  - Government regulation
  - Production process

What makes a monopoly?

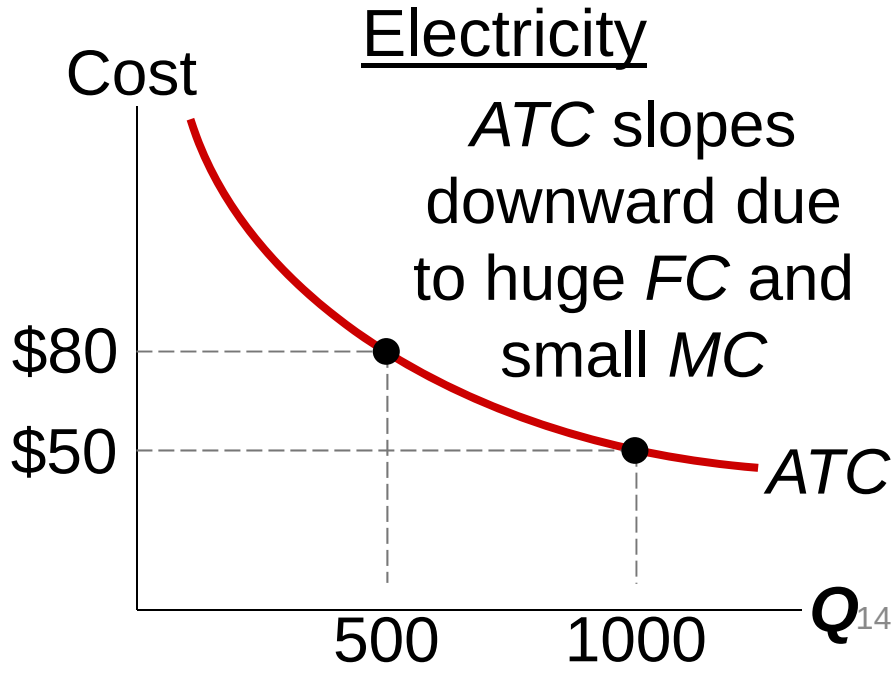
- **Monopoly resources:** A key resource required for production is owned by a single firm.
  - DeBeers owns most of the world's diamond mines.
- **Government regulation (Legal monopoly):** The government gives a single firm the exclusive right to produce some goods or services.
  - Patents, copyright, Green Minibus from Choi Hung to HKUST, etc.

What makes a monopoly?

- **Production process:** A single firm can produce output at a lower cost than can a larger number of producers.
  - Natural monopoly: A 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.



What makes a monopoly?

- Industry/production with forever decreasing ATC may be very rare.
- More likely for industry/production in which ATC stays in decreasing trend or “flat” for a wide range of output levels.

MR for a Monopoly

- The table shows the market demand (for a monopoly).
- What is its TR, MR and AR?

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			

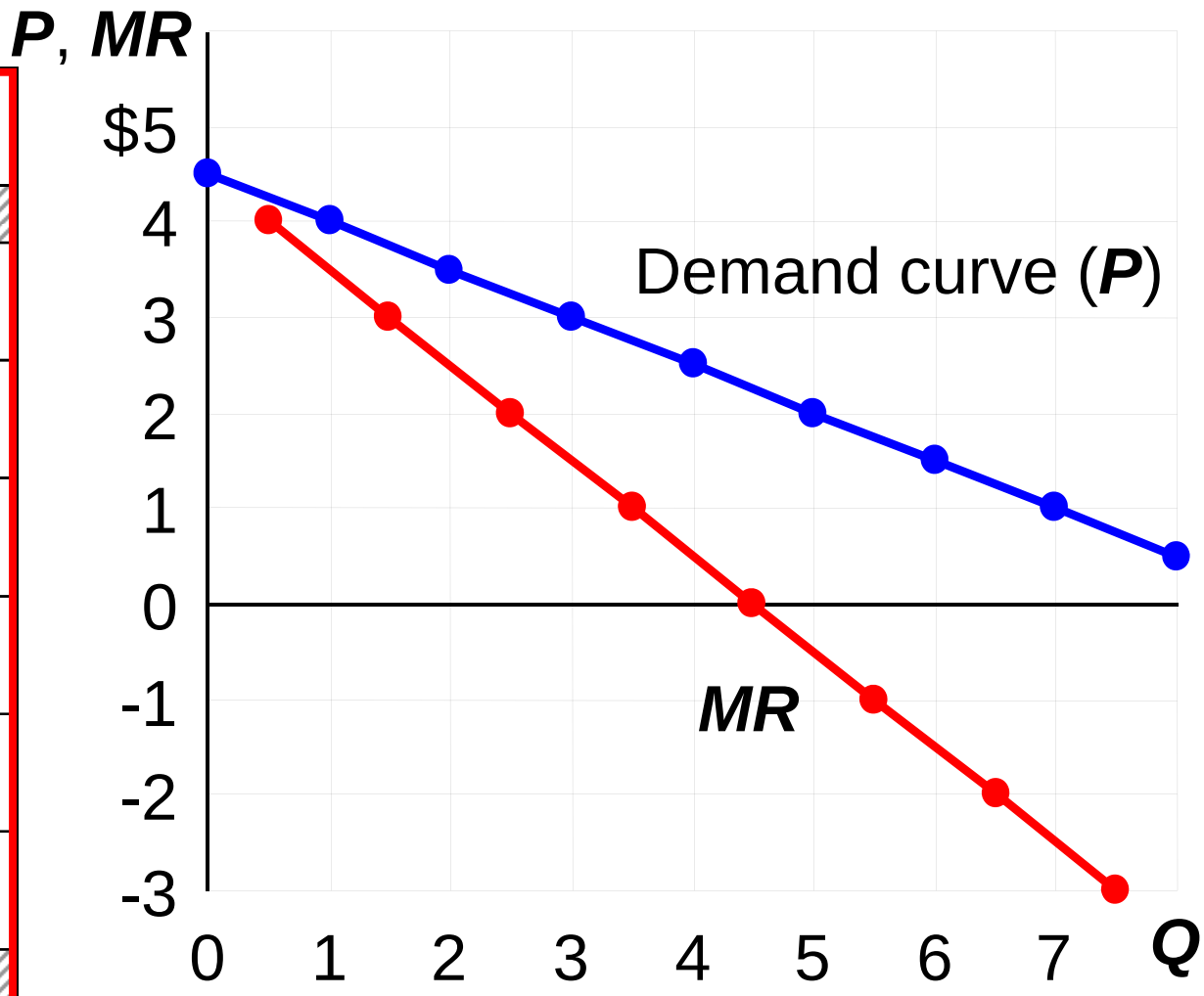
MR for a Monopoly

- The table shows the market demand (for a monopoly).
- What is its TR, MR and AR?
- Monopolist's TR is **NOT** a upward sloping straight line!
  - A competitive firm's TR is!
- Why? Why? Why?

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			

MR for a Monopoly

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

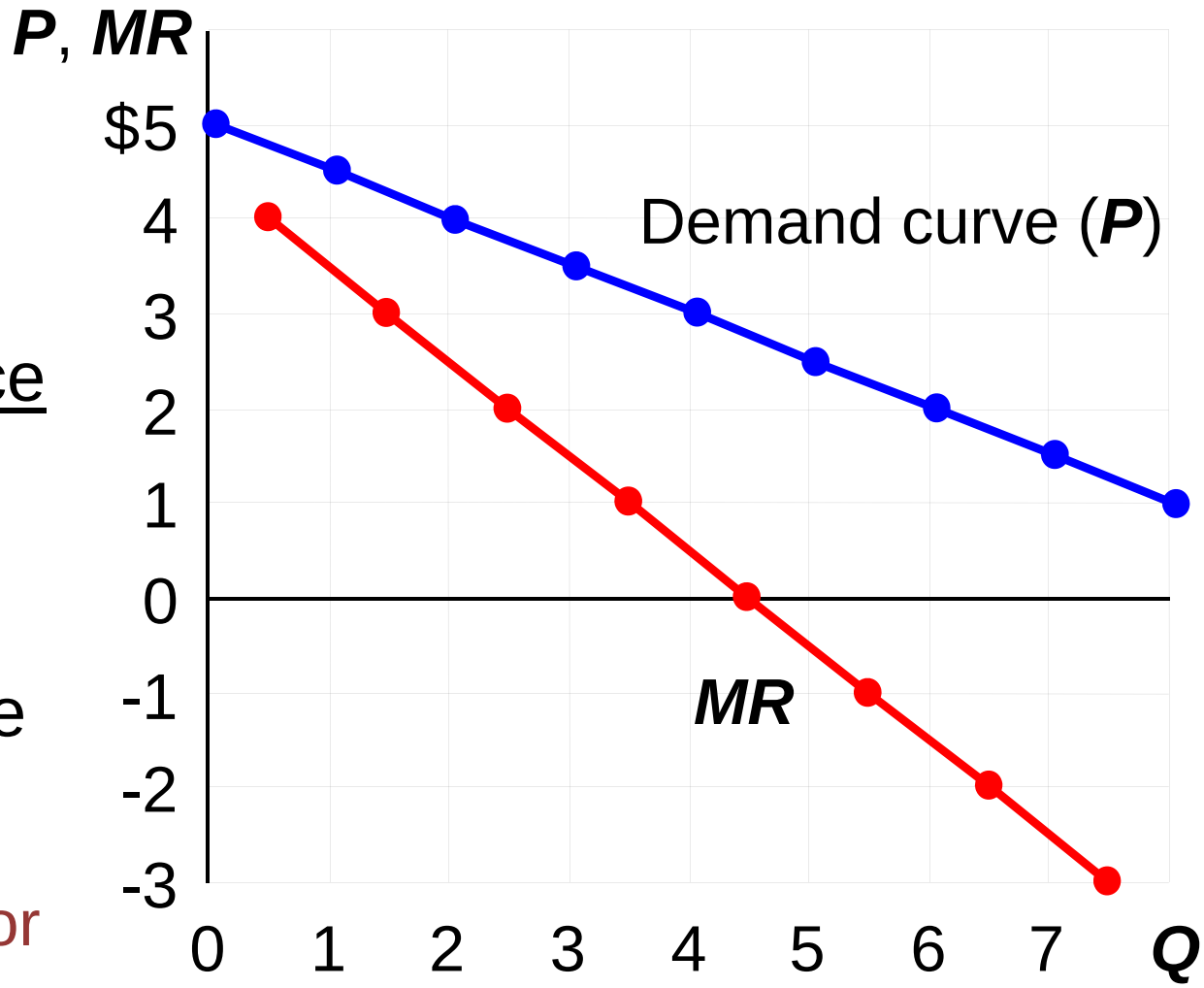


Understanding Monopolistic MR

- **Hence, MR < P, for a single-price monopoly.**
- To sell one more unit, price has to be reduced (for all units sold).
- Not only the price for that additional unit, but for all units:
  - $4, selling 1 unit ; $3.5, selling 2 units
  - MR for 2nd unit = $3.5 ???
  - MR for 2nd unit = $3.5*2 - $4*1 = $3 < price !!!
- Different from the MR faced by a competitive firm!

Understanding Monopolist's MR

- MR can be NEGATIVE if <u>lower revenue due to the reduction in price</u> outweighs the additional revenue from selling one more unit (higher Q).
  - Q from 5 to 6, for example



Quick check

If the demand for its product is inelastic, a monopoly's

A) total revenue increases when the firm lowers its price.

B) total revenue is unchanged when the firm lowers its price.

C) marginal revenue is negative.

D) marginal revenue is equal to zero.

E) marginal revenue is positive.

Quick check

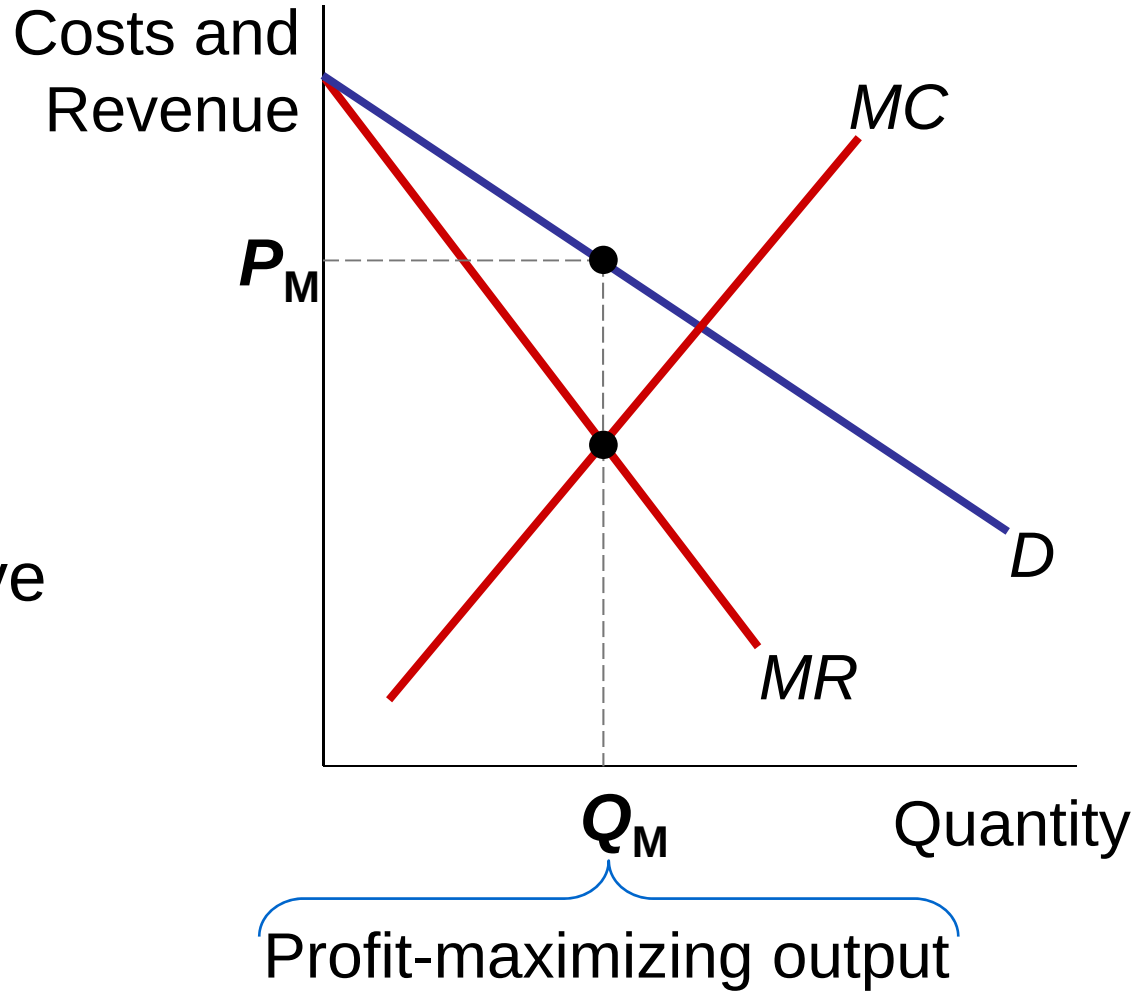
Profit-Maximizing Q

- Although a monopolist's MR is different from that of a competitive firm,
- **MR = MC** is STILL the condition for finding the profit-maximizing Q (Q_M).
- However, the determination of P would be **DIFFERENT**!
- Would P be the intersection of MR and MC (as in perfect competitive market)?

Profit Maximization

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

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



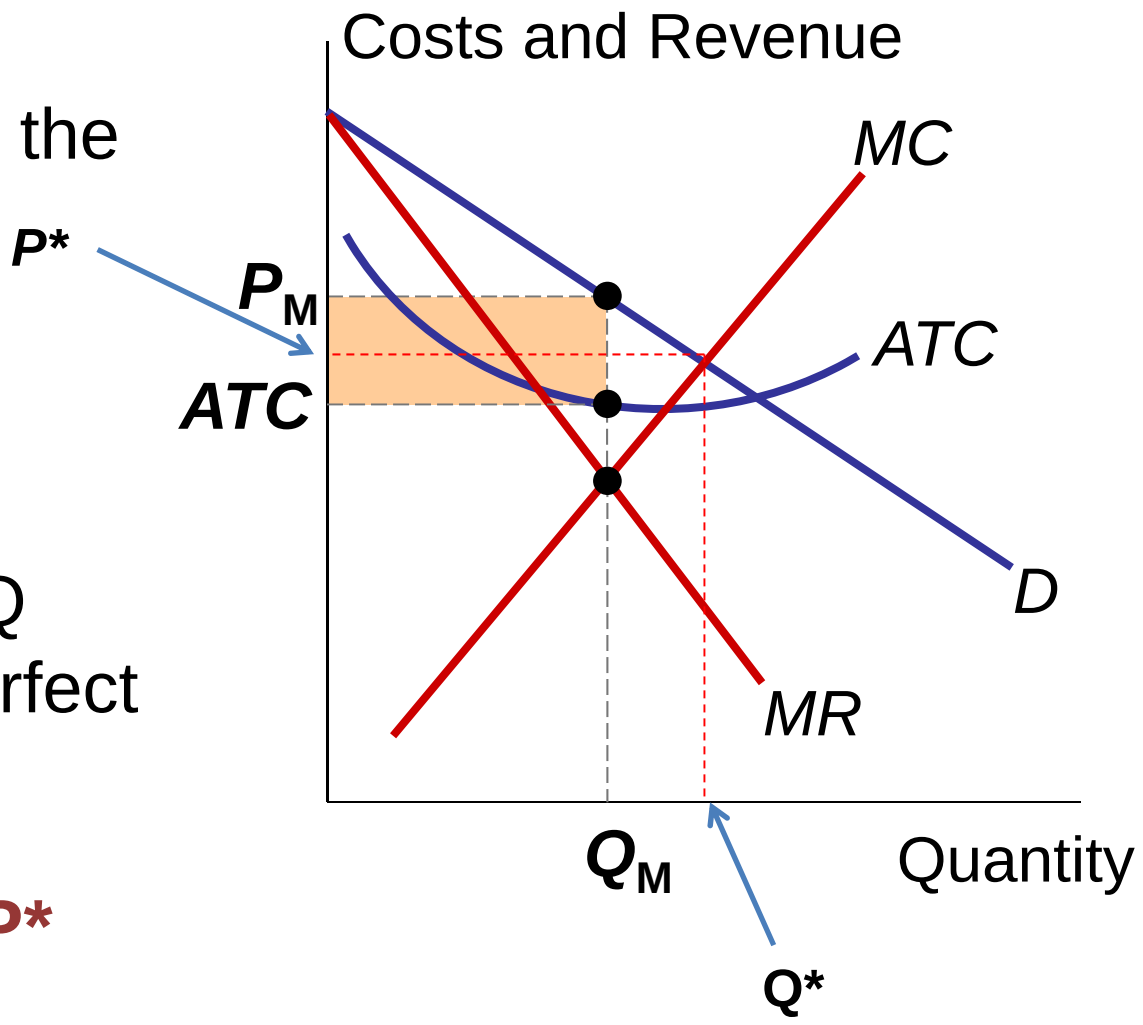
Profit Maximization

- Same as a competitive firm, the monopolist's profit equals

  $(P - ATC) \times Q$.

- How are P and Q different from perfect competition?

- $Q_M < Q^*$; $P_M > P^*$



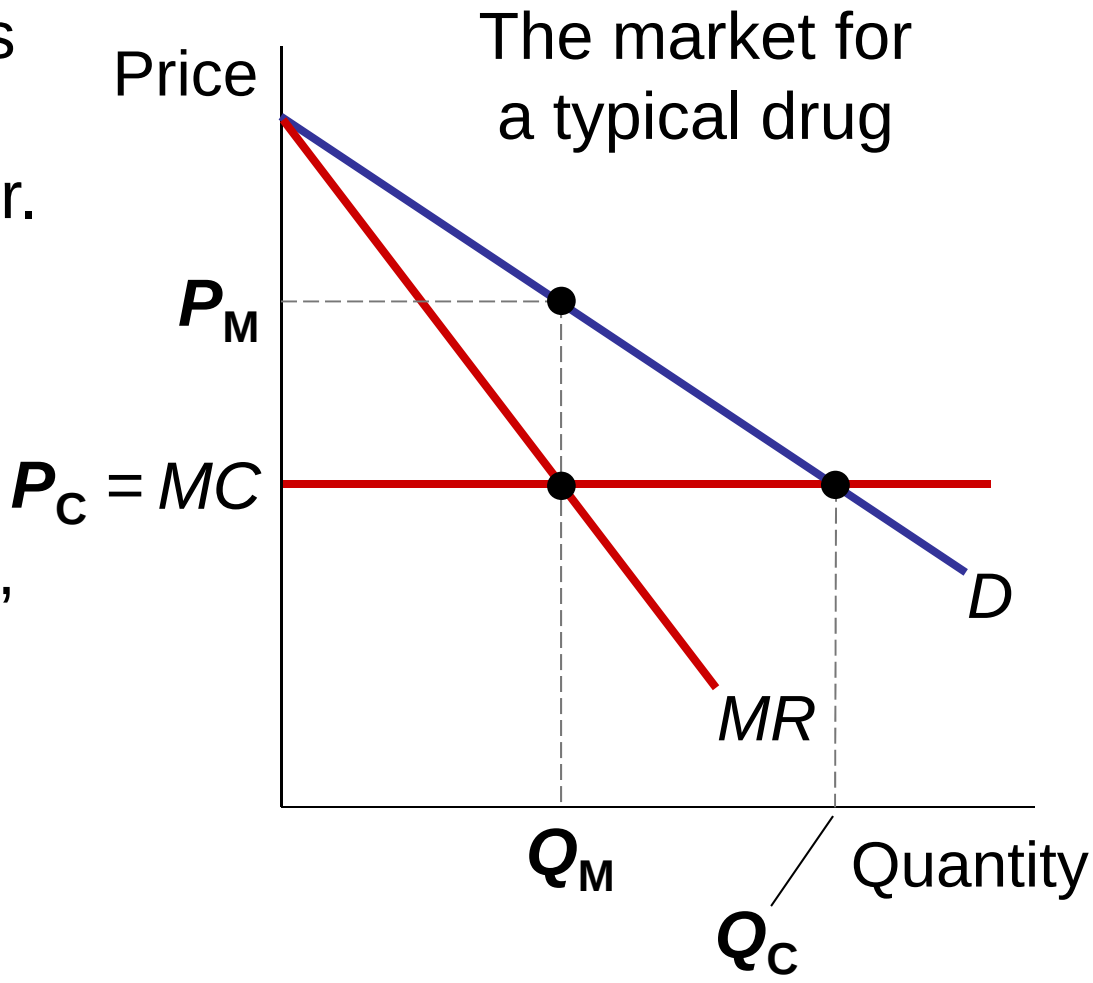
Monopoly does not have a S Curve

- A competitive firm
  - Price-takers: P* as given
  - Supply Curve: S = MC(Q) when P > min(AVC), shows how Q depends on P (or MR).
- A monopolistic firm
  - Price-setter/maker: Choose P under the restriction of Market Demand.
  - Q is determined by MR=MC, then P is on the Market Demand (WTP).
  - Q does not depend on P directly.
- **Hence, no supply curve for monopoly!**

Case Study: Generic Drugs

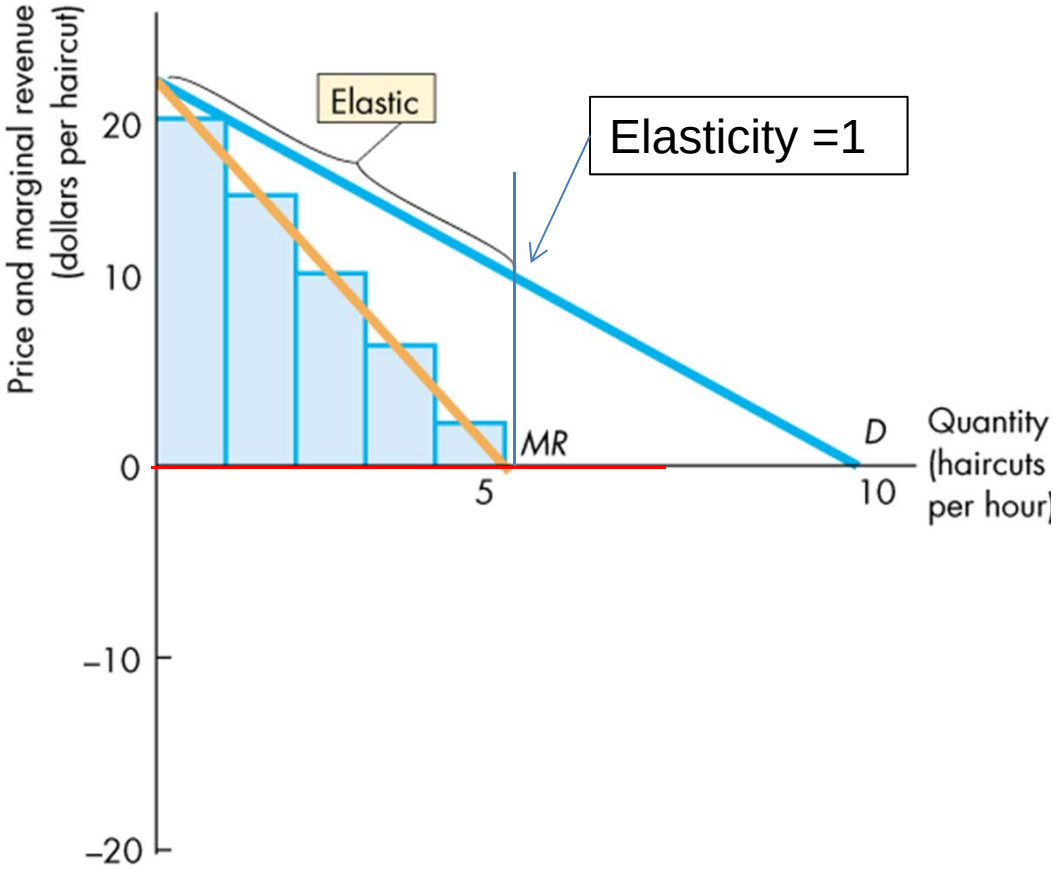
Patents on new drugs give a temporary monopoly to the seller.

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



Demand Elasticity

- Monopoly's MR is related to the elasticity of demand (linear case)
  - Demand: P = a – bQ
  - TR = PxQ = (a-bQ)Q
  - MR = a – 2bQ
- Assume MC = 0.
- Q_M will be at the mid-point of demand curve, where elasticity = 1.
- **What if MC > 0?**



(a) Demand and marginal revenue curves

WELFARE COMPARISON

Welfare Comparison – DW Loss

- Recall: Perfect competitive equilibrium, P=MR=MC and total surplus is maximized.
- For monopoly: P > MR = MC .
  - WTP > MC for the marginal unit Q_M
  - Q_M is too low: Larger total surplus if more Q were produced.
  - $Q_M < Q^*$ (equilibrium Q under perfect competition)
- **DW Loss as a result of monopoly!**
  - "None of my business", the monopoly said ☺

Welfare Comparison – DW Loss

Competitive Equilibrium:

Q^*, P = MC

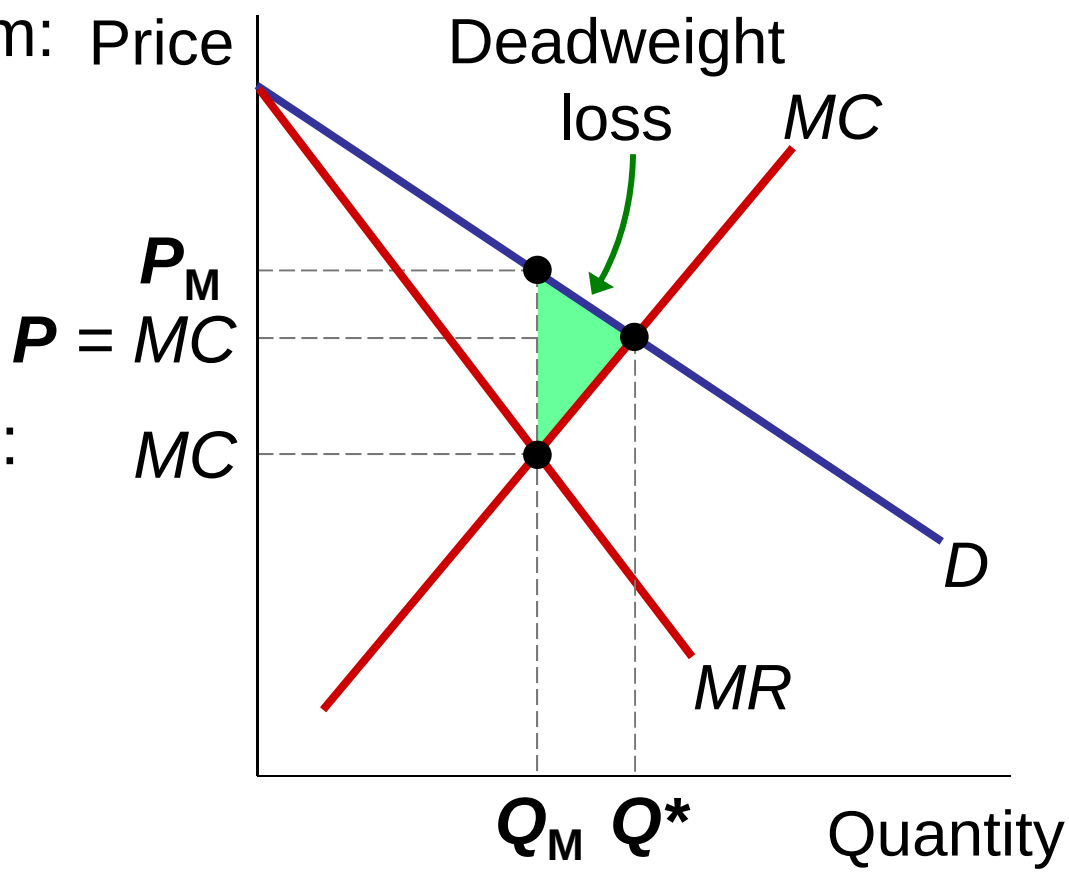
Total surplus is maximized

Monopoly Equilibrium:

$Q_M < Q^*$

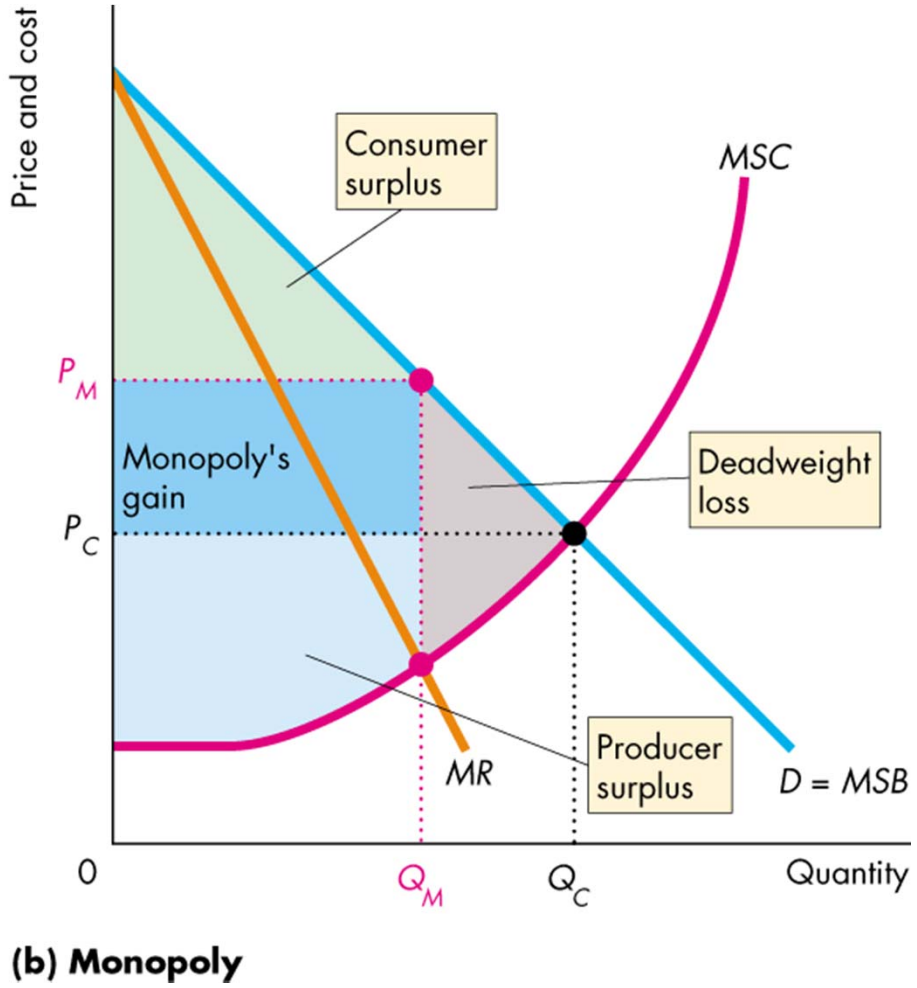
$P > MC$

Deadweight Loss



Welfare Comparison – Redistribution of Surplus

- Redistribution of Surplus
  - Some of the consumer surplus goes to the monopoly as producer surplus.



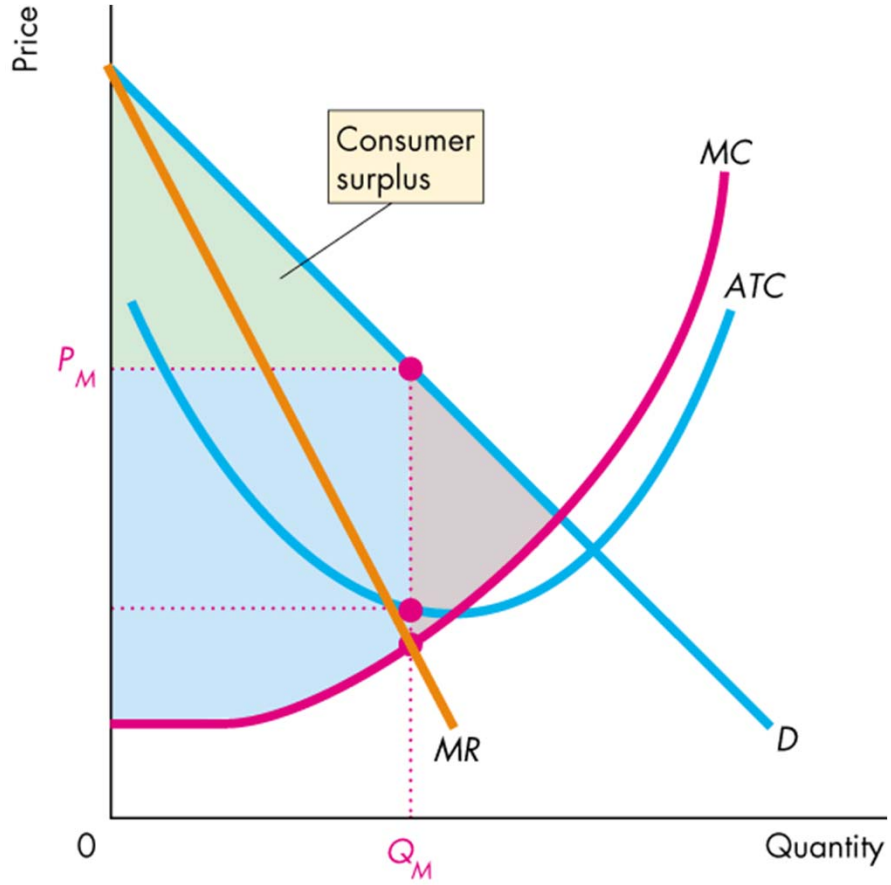
(b) Monopoly

Welfare Comparison – Rent Seeking

- Any surplus, including CS, PS, or economic profit, is called economic rent.
  - Rent: surplus that does NOT affect the quantity produced. (How is Q determined here?)
- **Rent Seeking activities:** Activities to capture economic rent
  - Buy a monopoly: Pay money to buy a monopoly (buy the amount of monopoly rent).
  - Create a monopoly: Use resources in political activities to become monopoly.

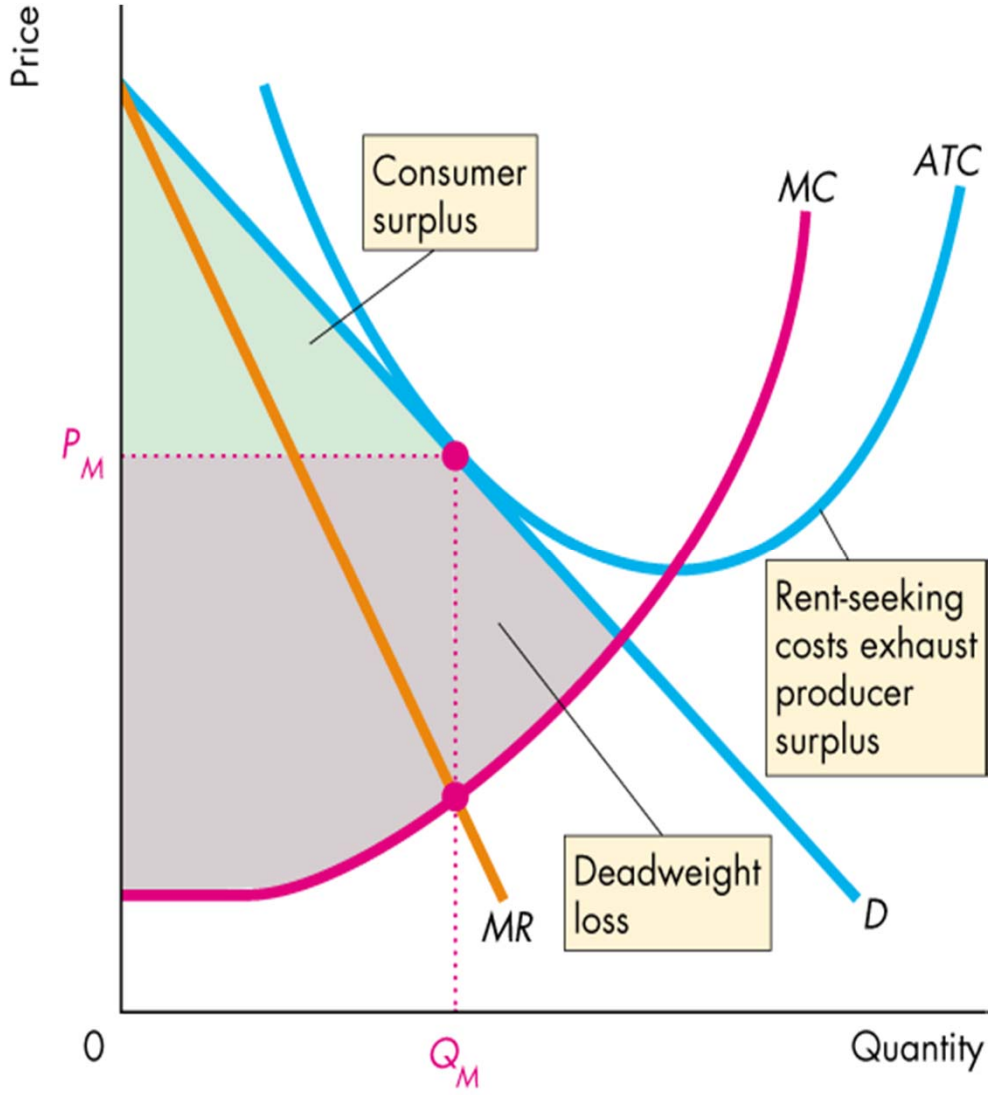
Welfare Comparison – Rent Seeking

- Rent-Seeking
  - The resources used in rent seeking can exhaust the monopoly's economic profit and the monopoly only breaks even.



Welfare Comparison – Rent Seeking

- Rent-Seeking
  - The resources used in rent seeking can exhaust the monopoly's economic profit and the monopoly only breaks even.



Quick check

Buying a monopoly from the existing owner does not ensure an economic profit because

A) the market for monopolies is a monopoly.

B) competition among buyers drives up the cost of buying the firm.

C) profits equal zero in the long run anyway.

D) of the deadweight loss triangle.

E) None of the above.

Quick check

Revision Question

- A reduction in a monopolist's fixed costs would

1) decrease the profit-maximizing price and increase the profit-maximizing quantity produced
2) increase the profit-maximizing price and decrease the profit-maximizing quantity produced
3) no effect on the profit-maximizing price or quantity
4) possibly increase, decrease or not effect profit-maximizing price and quantity, depending on the elasticity of demand.

Revision Question

Small Summary

- **MR < P:** Monopoly faces the whole Market Demand Curve by itself.
- **Determination of P:** Profit max Q (Q_M) is determined by MR=MC, then P is fixed on the Market Demand Curve.
- **Welfare:**
  - DW Loss due to $Q_M < Q^*$
  - Transfer of CS into Monopoly Rent
  - Rent seeking activities: Resources can be used for other production purposes (that creating more surplus).

PRICE DISCRIMINATION

Price Discrimination

- The above analysis is for a single-price monopoly.
  - One price for all units (of a good) it sells
- Is it possible for the monopoly to earn even more?
- Yes! By "**Price Discrimination**", but note that Monopoly have to know buyers' WTP to do this.

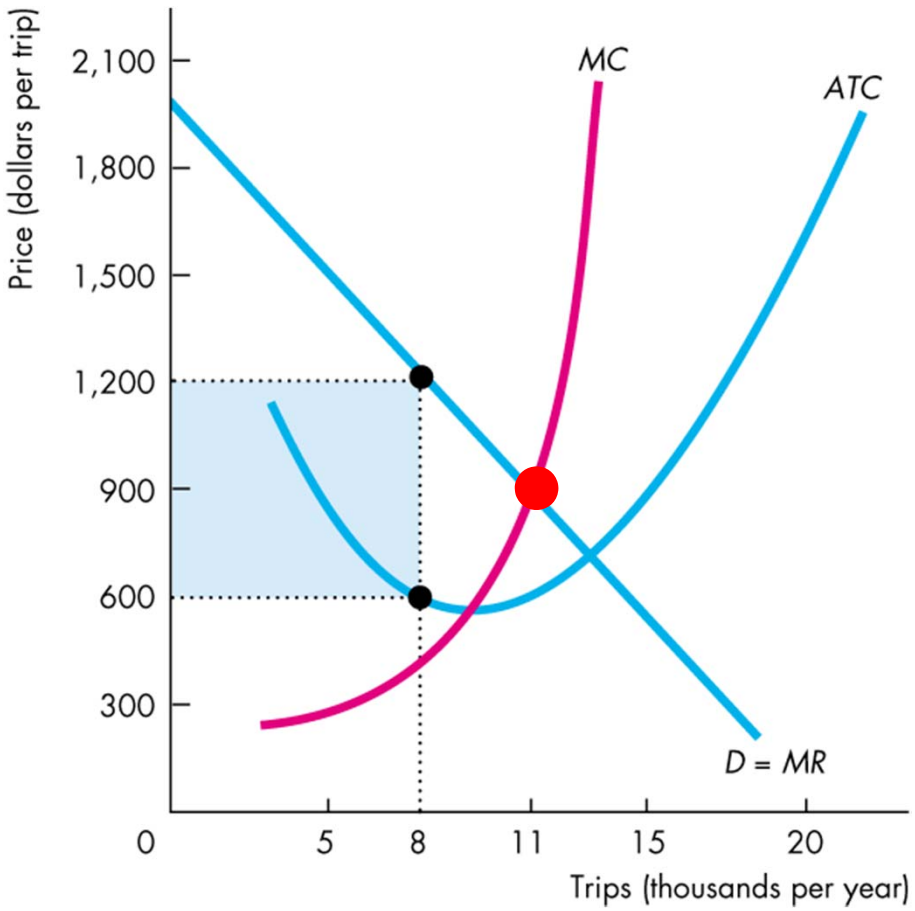
Perfect Price Discrimination

- **Perfect Price Discrimination:** Selling different units of a good (or service) to different buyers at different prices.
- Charge a higher price to buyers with higher WTP.
- A way to capture consumer surplus and converts it into economic profit.
- A "perfect" examples of Price Discrimination: **Perfect Price Discrimination.**

Perfect Price Discrimination

Perfect price discrimination

- If a firm is able to sell each unit of output for the highest price anyone is willing to pay,
- **Demand curve is the MR curve!**
- MR for each unit is ???



Perfect Price Discrimination

Perfect price discrimination - Example

- 1st Q, charge $4
- 2nd Q, charge $3.5
- 3rd Q, charge $3.0
- … …

- MR for each unit?

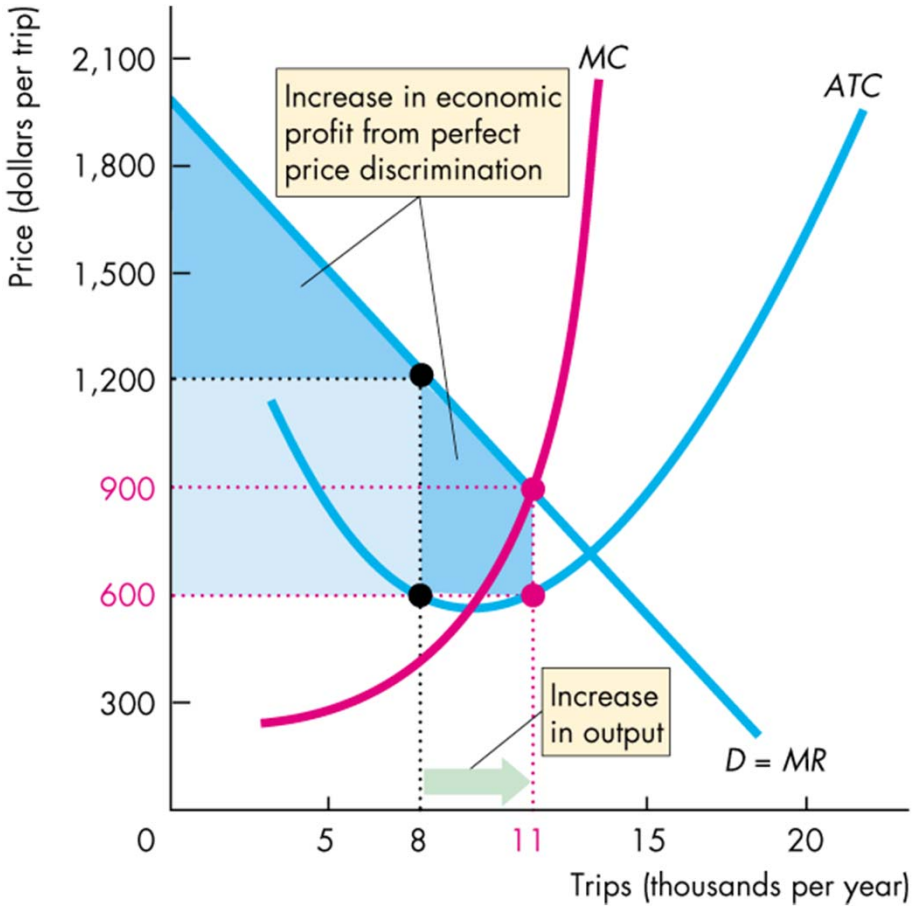
Q	*P*	*TR*	*AR*	*MR*
0	$4.50		n.a.	
1	4.00			
2	3.50			
3	3.00			
4	2.50			
5	2.00			
6	1.50			

Perfect Price Discrimination

- The profit-maximizing Q_M

increases to the quantity at which P = MC.

- Economic profit increases, and becomes more than a single-price monopoly.
- **DW Loss is eliminated.**
  - Therefore, from "efficiency" perspective as measured by total surplus, perfect price discrimination is equally efficient as perfect competition!



Perfect Price Discrimination

- If you are the monopoly, do you want to practice perfect price discrimination? ☺
  - The biggest size of profit
- However, not that easy! ☹
  - Two conditions…

Perfect Price Discrimination

- Knowing the WTP of buyers!!!
  - Unless, you have a super-machine that can read buyers' minds.
- No resell of goods among buyers with different WTP
  - Movie ticket, software (student price): registration and confirmation your student ID, warranty of durable goods (camera)
  - Costly to implement, and sometimes impossible
- **Very difficult!!!!!!!**

Price Discrimination Story

- There is a seafood restaurant.
- Visitors must take a road along a hillside, down to the restaurant near the seafront.
- Therefore, the restaurant owner can see each car coming down the road before they get to his restaurant.
- What can he do?
- If the car is expensive, he takes out a menu with higher price!!! ☺

Other forms of Price Discrimination

- If perfect price discrimination (discrimination on everyone) is impossible in practice, a monopoly can “test/experiment” consumers and try to make estimates. ☺
- Discriminating among buyer groups:
  - Different prices in different country: Drugs, textbooks. Different income levels (affordability) in different countries (Dumping has to be effectively prevented).
  - Age-based discounts: Movie, airline tickets, etc.

Other forms of Price Discrimination

- Use of obstacles: Coupons, mail-in rebates. High income group has no time to spend on coupons and mail-in rebates.
- Airline tickets with Saturday-night stay-over: Business travelers vs. tourists. Business travelers are usually willing to pay more.
- Financial aid for low income family by universities and colleges: Discrimination between different income groups – Discount for low income group.

- Discriminating among units of a good sold
  - Quantity discounts: Discount for buying in bulk

Other forms of Price Discrimination – among units of a good

- Demand for Egg Tart (of You)
  - $3 each, how many would you buy?
  - 2 egg tarts, and CS = $0.5.
- $8.4 for x3, a good deal?
  - CS = $0.6 at the deal
- Without quantity discount, what price should be set for selling x3?
  - $2.5 , and CS = $1.5
- Charging different prices for different units for the same buyer
  - Profit for monopoly increases.

Quantity	WTP
1	3.5
2	3
3	2.5
4	2
5	1.5
6	1
7	0.5
8	0

Summary – Price Discrimination

- Different groups are associated with different levels of WTP (on average).
- Price discrimination of “imperfect forms” still helps to increase profit of monopoly, but to a lesser extent.
- Information issue!!! Monopoly does not have detailed information on WTP.
- **“Information” plays a very important role in economics!**

Summary – Price Discrimination

- However, price differences that arise from cost differences **ARE NOT** price discrimination.
  - Peak-Hour price for transportation: More workers to maintain the services, higher costs.
  - VIP room in restaurants: Better services and decoration.
  - First-class airline tickets

Quick check

If a monopolist can perfectly price discriminate, then

A) it will charge just two different prices in two different markets.

B) it will not give a discount to those who buy in bulk.

C) the deadweight loss is zero.

D) there will be no consumer surplus.

E) Both C) and D) are correct.

Quick check

Regulating Monopoly

- **To promote competition by regulations:**
  - Merge of Coco-cola and Pepsi?
  - Some countries have regulation to prevent such merge to happen, as it is “anti-competition” .
  - Anti-trust law: Microsoft cannot pre-install Internet Explore (IE) with Window products.
- To prevent the appearance of monopoly or
- A monopoly to extend its monopoly power to other goods.

Regulating Monopoly

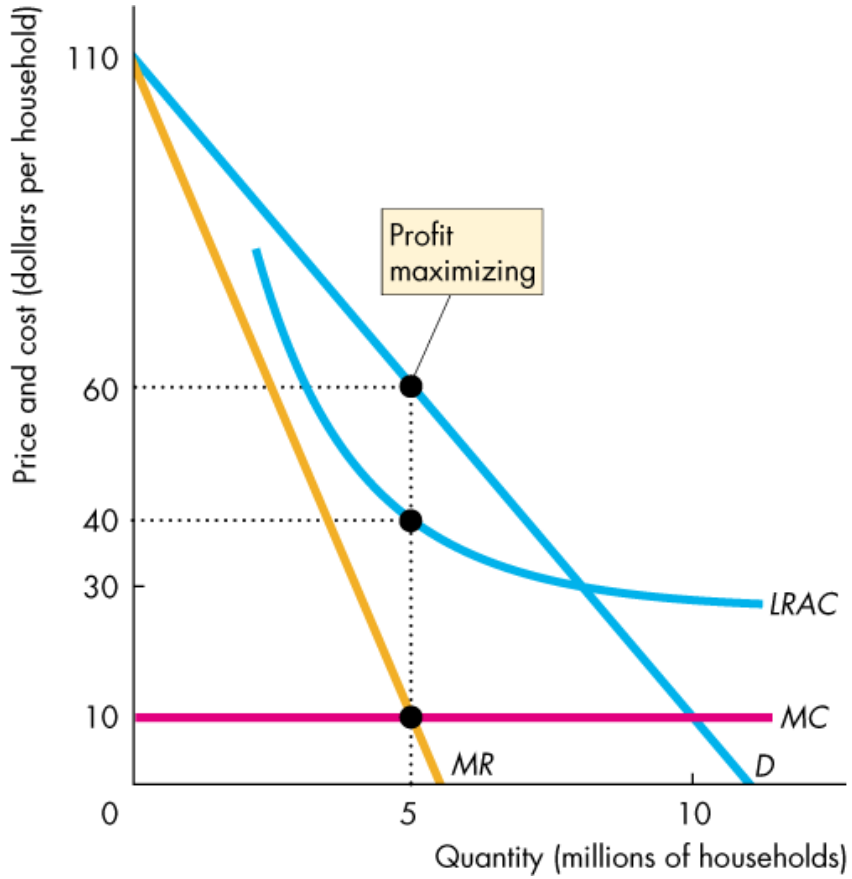
- Difficulties of regulation Anti-trust law:
  - Merge may lower production costs due to economies of scale and/or economies of scope (synergies) – for real business purposes, but not anti-competitive.
  - Balance between lower costs and inefficiency of monopoly due to reduced competition.
  - HARD to measure the benefits and costs
  - Disagreement between firms and government, and very costly to solve the disagreement in court.

Regulating Monopoly

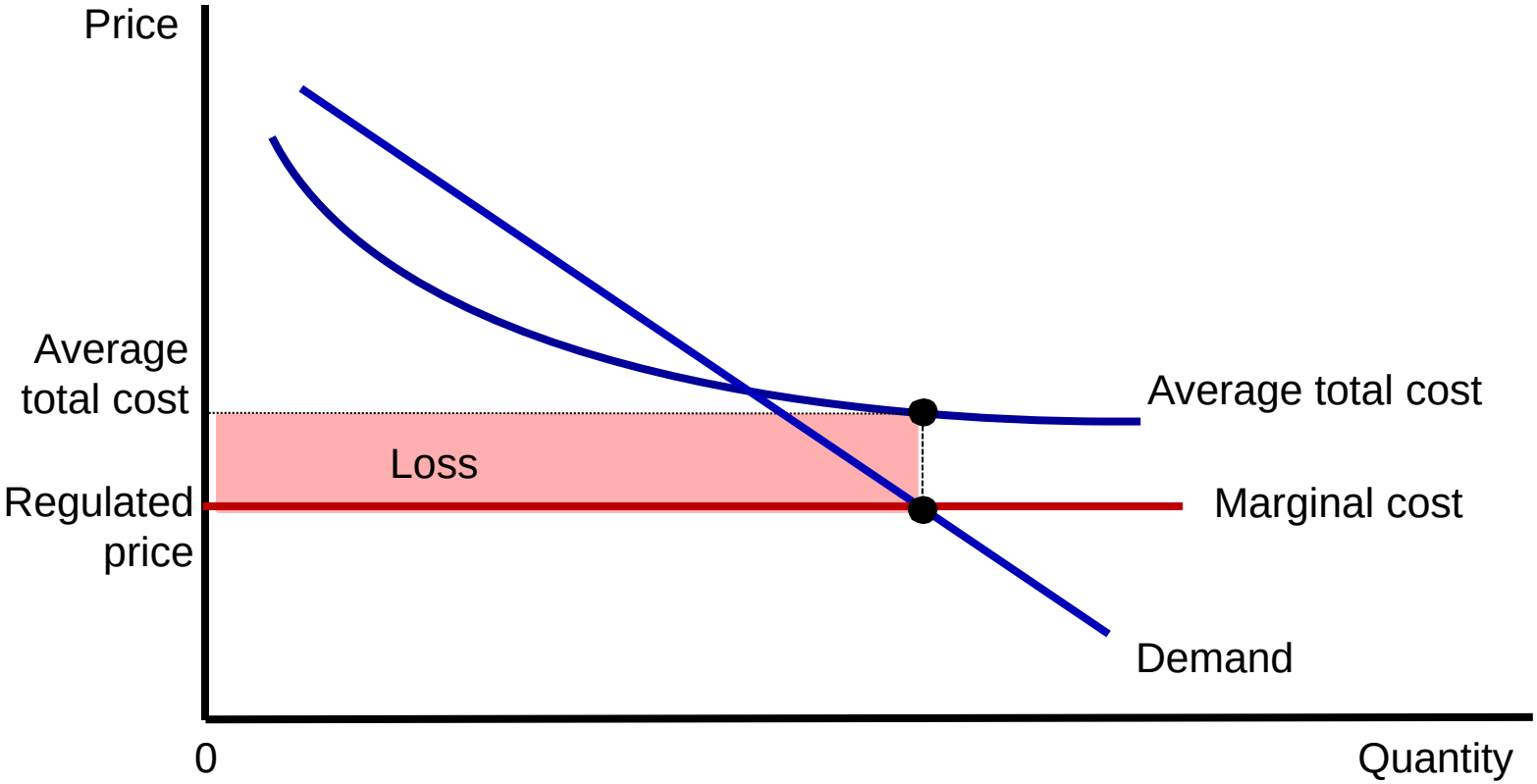
- **Usually regulating the behavior of monopoly's pricing.**
- EXAMPLES: Electricity, gas, water, telephone services, mostly are so-called: "Natural Monopoly", which are related to daily living, and attract lots of attention from politicians and economists.
  - Lower price and push Qm to Q*
  - Pricing cannot exceed certain level according to certain measurements: Usually on monopoly's profitability, such as return of capital/equity.

Regulating Natural Monopoly

- Figure 13.11 illustrates the marginal cost pricing rule.
- Unregulated, the natural monopoly maximizes economic profit by producing the quantity at which marginal revenue equals marginal cost …
- and charging the highest price at which that quantity will be bought.
- What happens when P=MC?

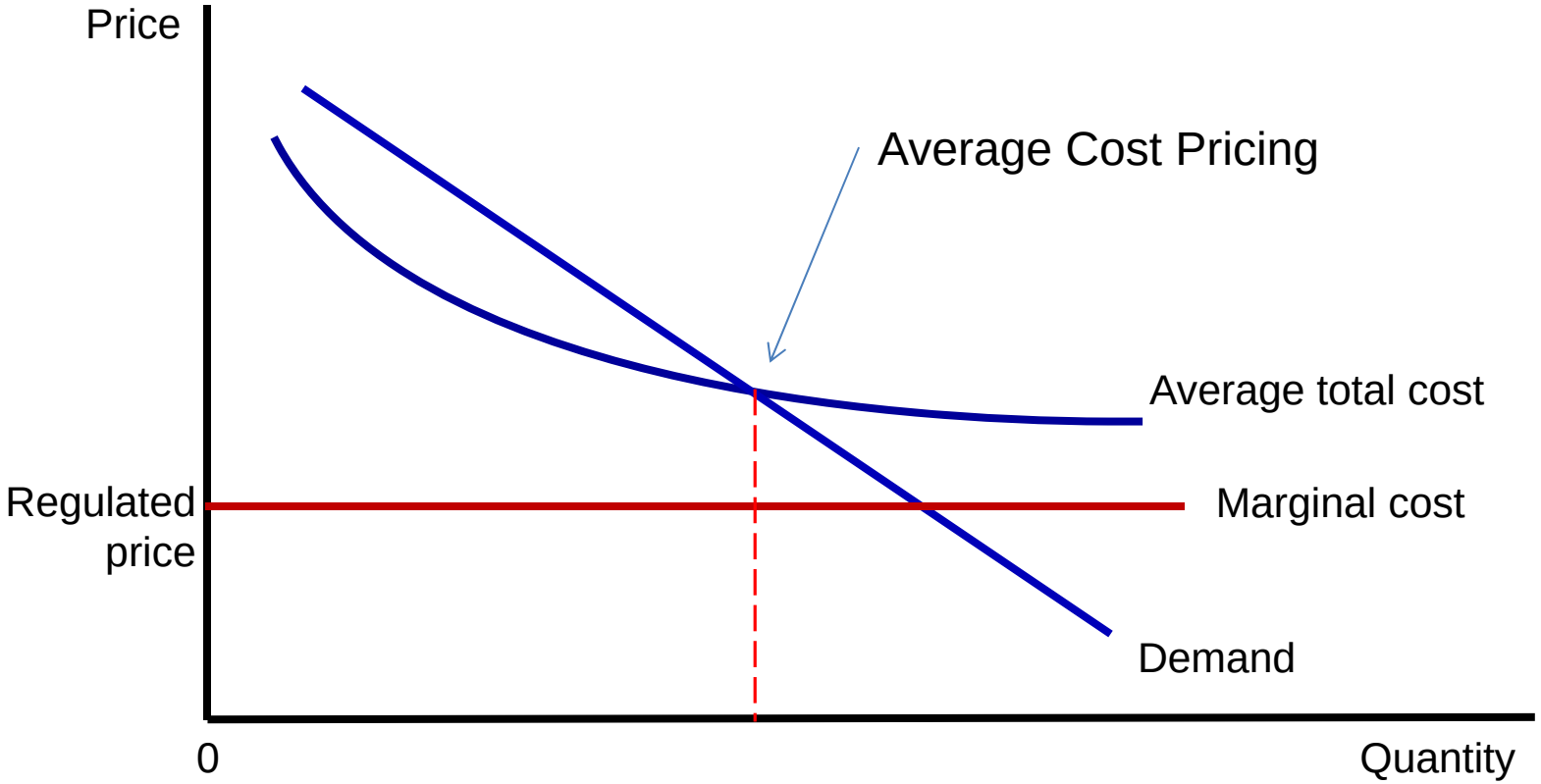


Regulating Natural Monopoly – MC Pricing



- A natural monopoly to charge a price equal to MC, P will be below ATC, and the monopoly is in lose.
- Use MC pricing, but Government subsidies the loss. Good or bad?

Regulating Natural Monopoly – AC Pricing



Average Cost Pricing means zero economics profit for monopoly, but leads to DW loss. How big the DW loss in the above diagram?

Regulating Monopoly

Regulating by ownership:

- Of course, government-owned is a common way to deal with monopoly.
- So that “profit” will not be the only objective of monopoly after being government-owned enterprise.
- However, many cases have shown that “inefficiency”, including poor quality, less varieties, expensive prices (ironically) would be the outcome. ☹

Regulating Monopoly

Doing nothing

- Cost from regulating monopoly is larger than the inefficiency due to lacking of competition (Chicago School tradition).
- We have also seen that perfect price discrimination can lead to efficient output level (Q*).
  - Imperfect price discrimination still provides incentive to monopoly in producing “closer” to Q*.

End for today ☺

Thank you very much

See you next time !