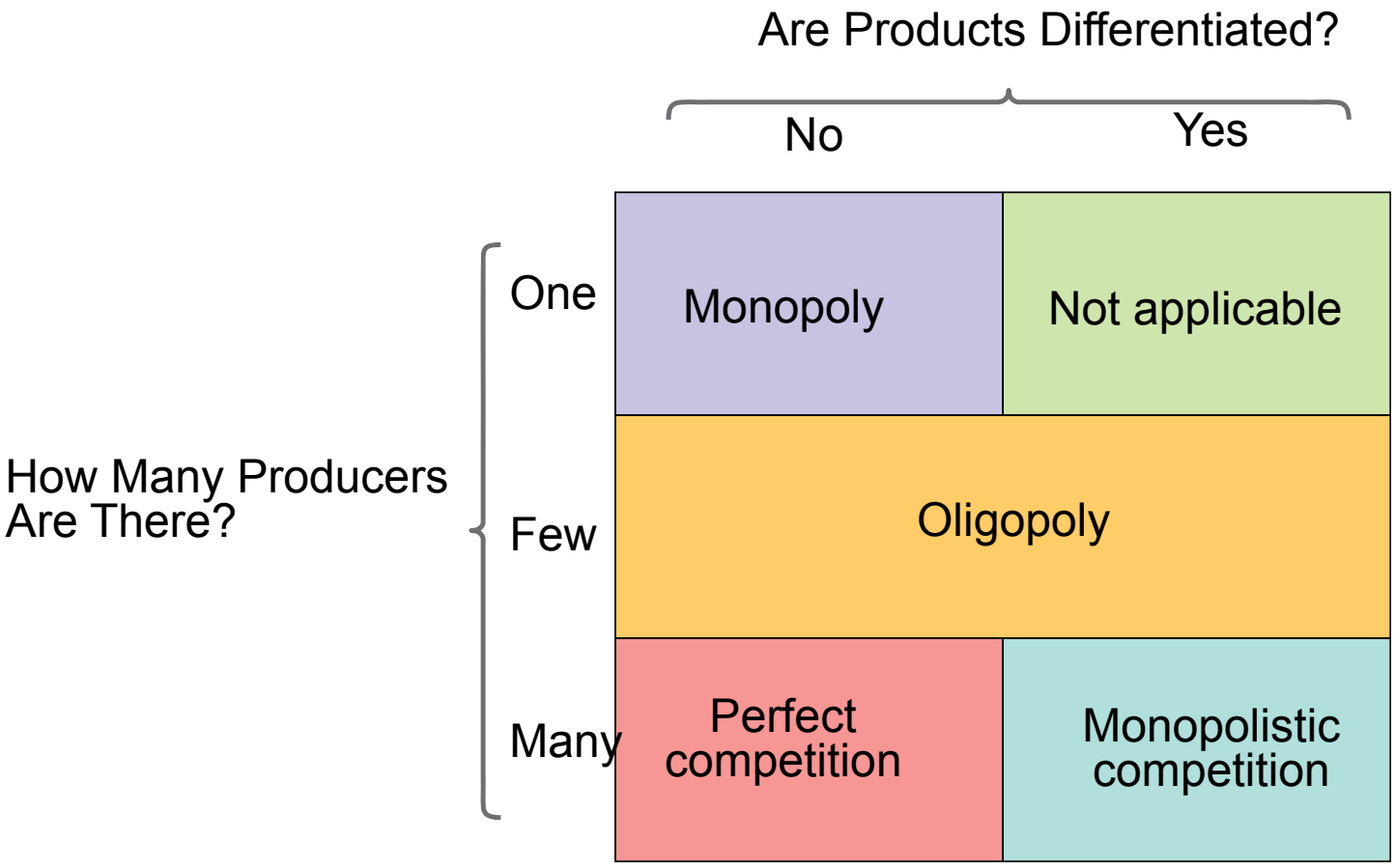
Monopoly

EE 211

- The significance of monopoly, where a single monopolist is the only producer of a good
- How a monopolist determines its profit-maximizing output and price
- The difference between monopoly and perfect competition, and the effects of that difference on society's welfare
- How policy makers address the problems posed by monopoly

Types of Market Structure



The Meaning of Monopoly

A **monopolist** is a firm that is the only producer of a good that has no close substitutes. An industry controlled by a monopolist is known as a **monopoly.** *e.g. De Beers*

The ability of a monopolist to raise its price above the competitive level by reducing output is known as **market power.**

Why Do Monopolies Exist?

- A ***monopolist*** has *market power* and as a result will charge higher prices and produce less output than a competitive industry. This generates profit for the monopolist in the short run and long run.

- Profits will not persist in the long run unless there is a **barrier to entry**. This can take the form of
  - Control of natural resources or inputs
  - Increasing returns to scale
  - Technological superiority
  - Government-created barriers including patents and copyrights.

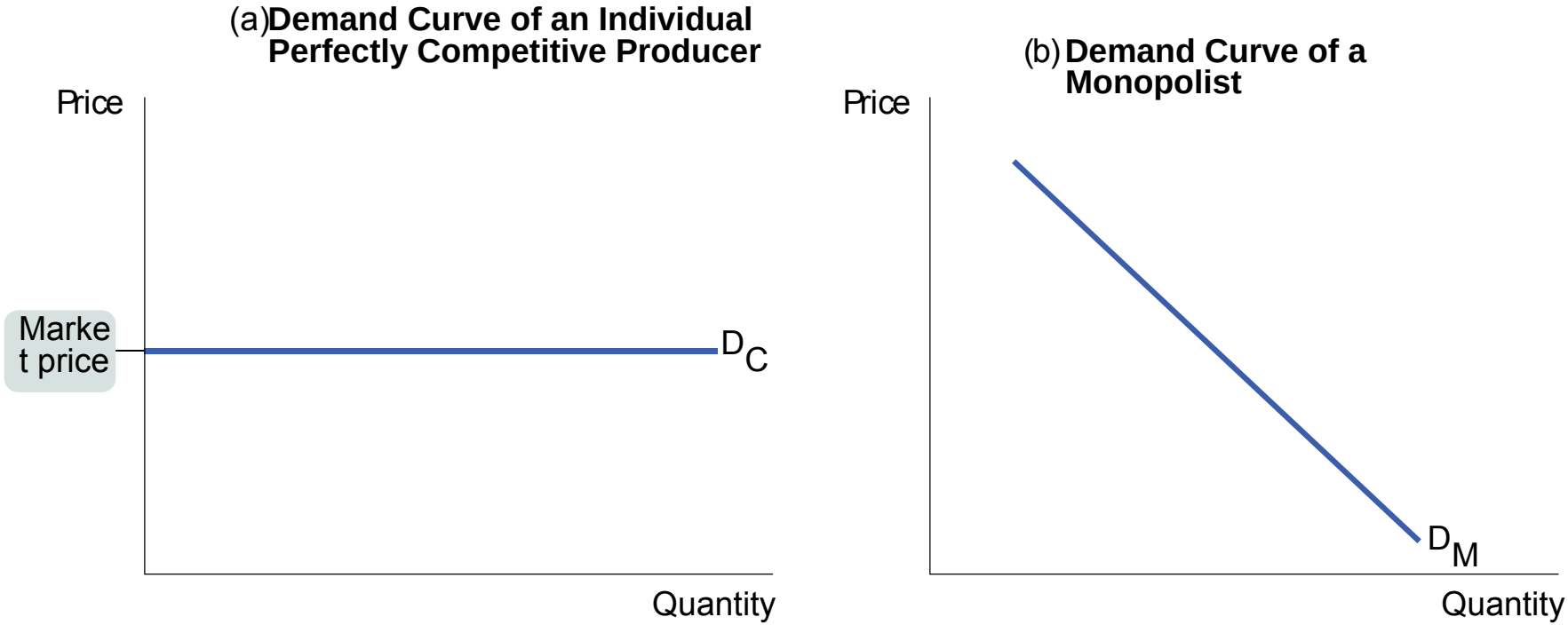
Economies of Scale and Natural Monopoly

- A **natural monopoly** exists when increasing returns to scale provide a large cost advantage to a single firm that produces all of an industry's output**.**
- It arises when increasing returns to scale provide a large cost advantage to having all of an industry's output produced by a single firm.
- Under such circumstances, average total cost is declining over the output range relevant for the industry.
- This creates a barrier to entry because an established monopolist has lower average total cost than any smaller firm.

How a Monopolist Maximizes Profit

- The price-taking firm's optimal output rule is to produce the output level at which the marginal cost of the last unit produced is equal to the market price.
- A monopolist, in contrast, is the sole supplier of its good. So its demand curve is simply the market demand curve, which is downward sloping.
- This downward slope creates a "wedge" between the price of the good and the marginal revenue of the good—the change in revenue generated by producing one more unit.

Comparing the Demand Curves



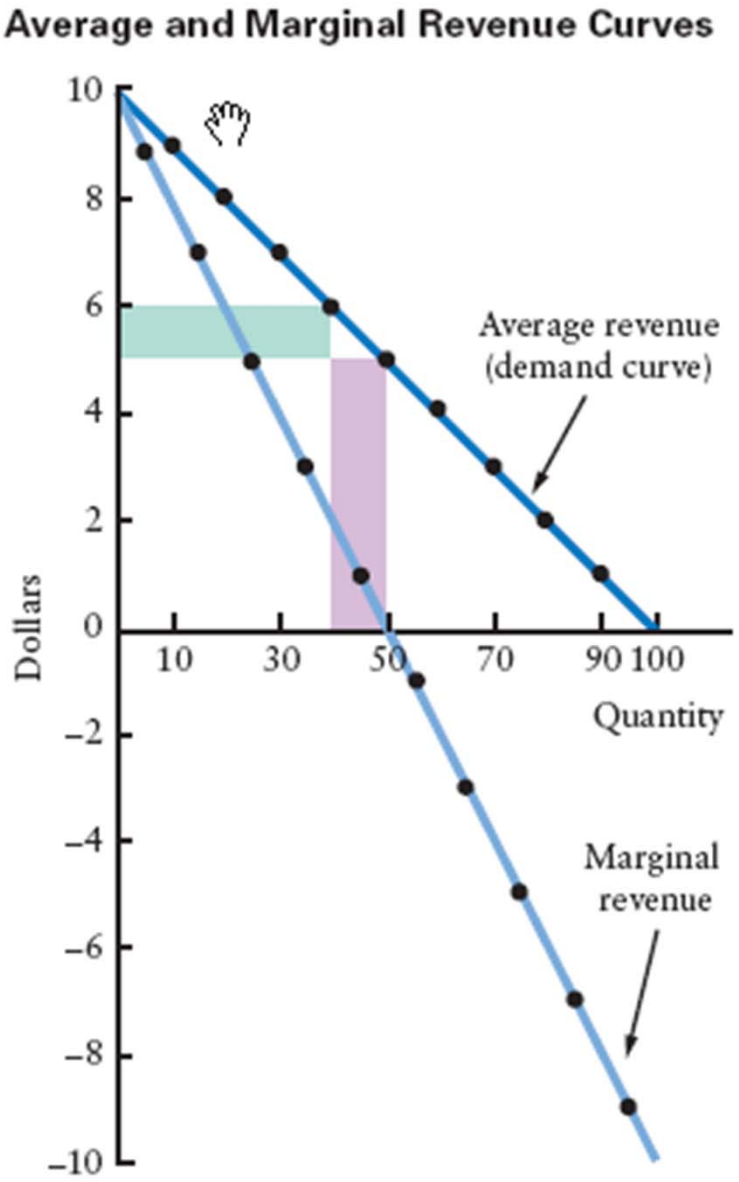
An individual perfectly competitive firm cannot affect the market price of the good → it faces a horizontal demand curve *DC* , as shown in panel (a).

A monopolist, on the other hand, can affect the price (sole supplier in the industry) → its demand curve is the market demand curve, *DM,* as shown in panel (b). To sell more output it must lower the price; by reducing output it raises the price.

A Monopolist's Average and Marginal Revenue

Computing Average and Marginal Revenue

(1) Price (average revenue)	(2) Quantity Sold Q	(3) Total Revenue ($p \times Q$)	(4) Change in Total Revenue (ΔTR)	(5) Marginal Revenue ($\Delta TR/\Delta Q$)
10	0	0		
9	10	90	90	9
8	20	160	70	7
7	30	210	50	5
6	40	240	30	3
5	50	250	10	1
4	60	240	−10	−1
3	70	210	−30	−3
2	80	160	−50	−5
1	90	90	−70	−7
0	100	0	−90	−9



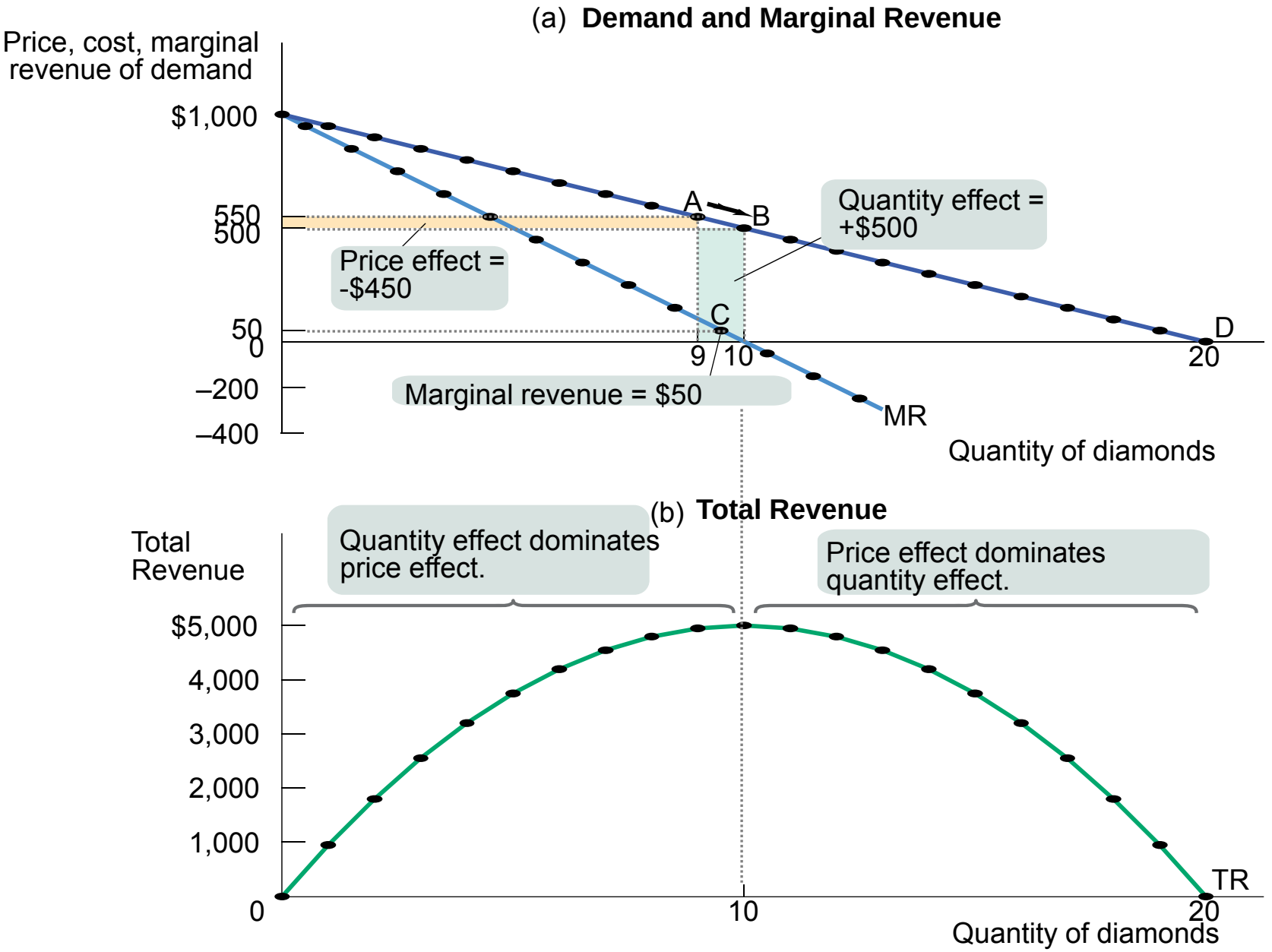
How a Monopolist Maximizes Profit

- An increase in production by a monopolist has two opposing effects on revenue:
- *A **quantity effect***. One more unit is sold, increasing total revenue by the price at which the unit is sold.
- *A **price effect***. In order to sell the last unit, the monopolist must cut the market price on *all* units sold. This decreases total revenue.
- The quantity effect and the price effect are illustrated by the two shaded areas in panel (a) of the following figure based on the numbers on the table accompanying it.

A Monopolist's Demand, TR, and MR Curves

Demand, Total Revenue, and Marginal Revenue for the De Beers Monopoly

Price of diamond P	Quantity of diamonds Q	Total revenue $TR = P \times Q$	Marginal revenue $MR = \Delta TR/\Delta Q$
$1,000	0	$0	
			$950
950	1	950	
			850
900	2	1,800	
			750
850	3	2,550	
			650
800	4	3,200	
			550
750	5	3,750	
			450
700	6	4,200	
			350
650	7	4,550	
			250
600	8	4,800	
			150
550	9	4,950	
			50
500	10	5,000	
			−50
450	11	4,950	
			−150
400	12	4,800	
			−250
350	13	4,550	
			−350
300	14	4,200	
			−450
250	15	3,750	
			−550
200	16	3,200	
			−650
150	17	2,550	
			−750
100	18	1,800	
			−850
50	19	950	
			−950
0	20	0	


(a) Demand and Marginal Revenue
Price, cost, marginal revenue of demand
$1,000
550
500
50
0
–200
–400
A
B
C
D
MR
Quantity effect = +$500
Price effect = -$450
Marginal revenue = $50
9
10
20
Quantity of diamonds
(b) Total Revenue
Total Revenue
Quantity effect dominates price effect.
Price effect dominates quantity effect.
$5,000
4,000
3,000
2,000
1,000
0
TR
10
20
Quantity of diamonds

Monopolist's Demand Curve and Marginal Revenue

- Due to the price effect of an increase in output, the marginal revenue curve of a firm with market power always lies below its demand curve. So a profit-maximizing monopolist chooses the output level at which marginal cost is equal to marginal revenue—*not* to price.
- As a result, the monopolist produces less and sells its output at a higher price than a perfectly competitive industry would. It earns a profit in the short run and the long run.

Monopolist's Demand Curve and Marginal Revenue

- To emphasize how the quantity and price effects offset each other for a firm with market power, notice the hill-shaped total revenue curve:

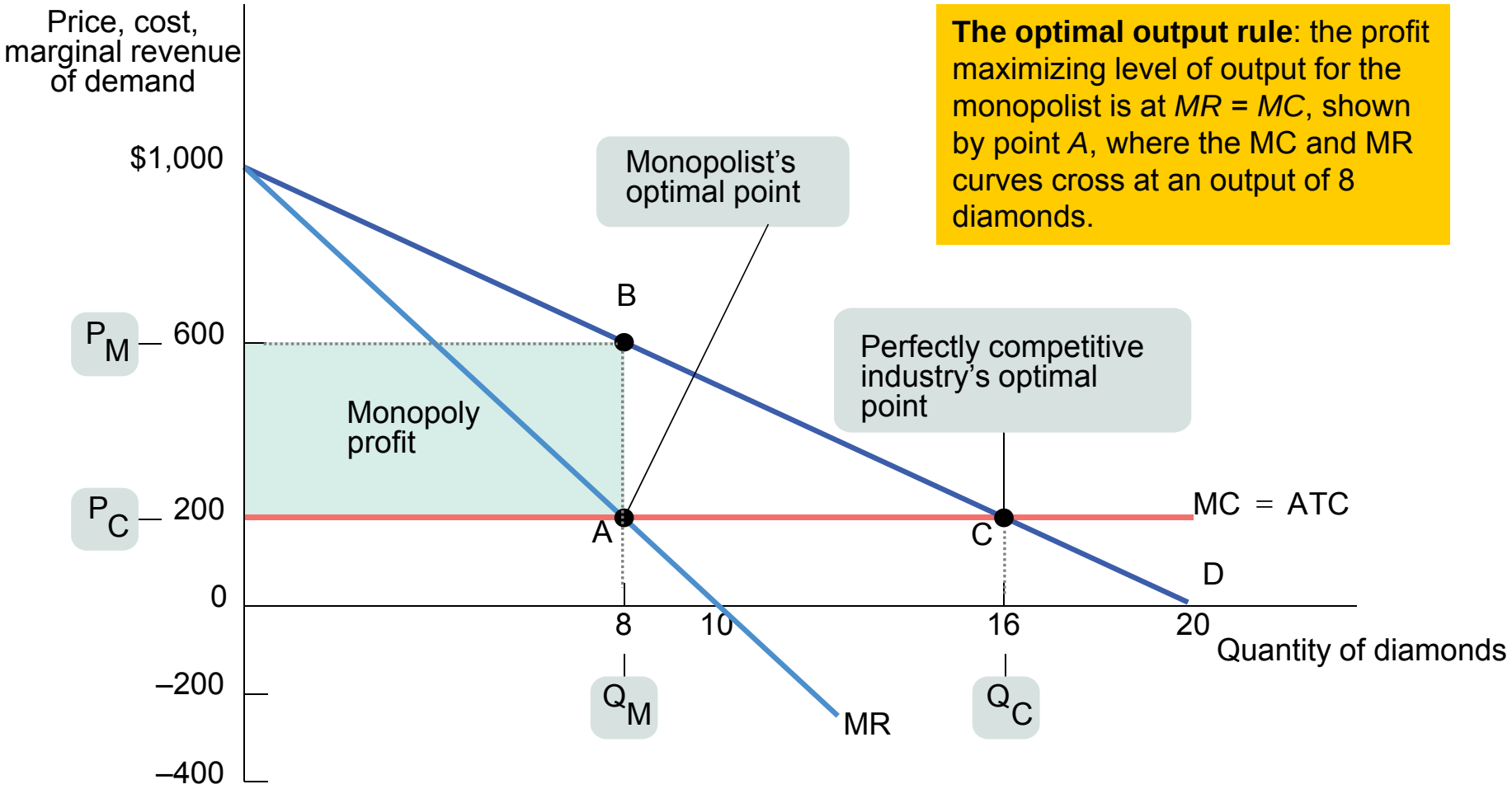
- This reflects the fact that *at low levels of output, the quantity effect is stronger than the price effect:* as the monopolist sells more, it has to lower the price on only very few units, so the price effect is small.

- As output rises beyond 10 diamonds, total revenue actually falls. This reflects the fact that *at high levels of output, the price effect is stronger than the quantity effect:* as the monopolist sells more, it now has to lower the price on many units of output, making the price effect very large.

Monopolist's Profit-Maximizing Output and Price

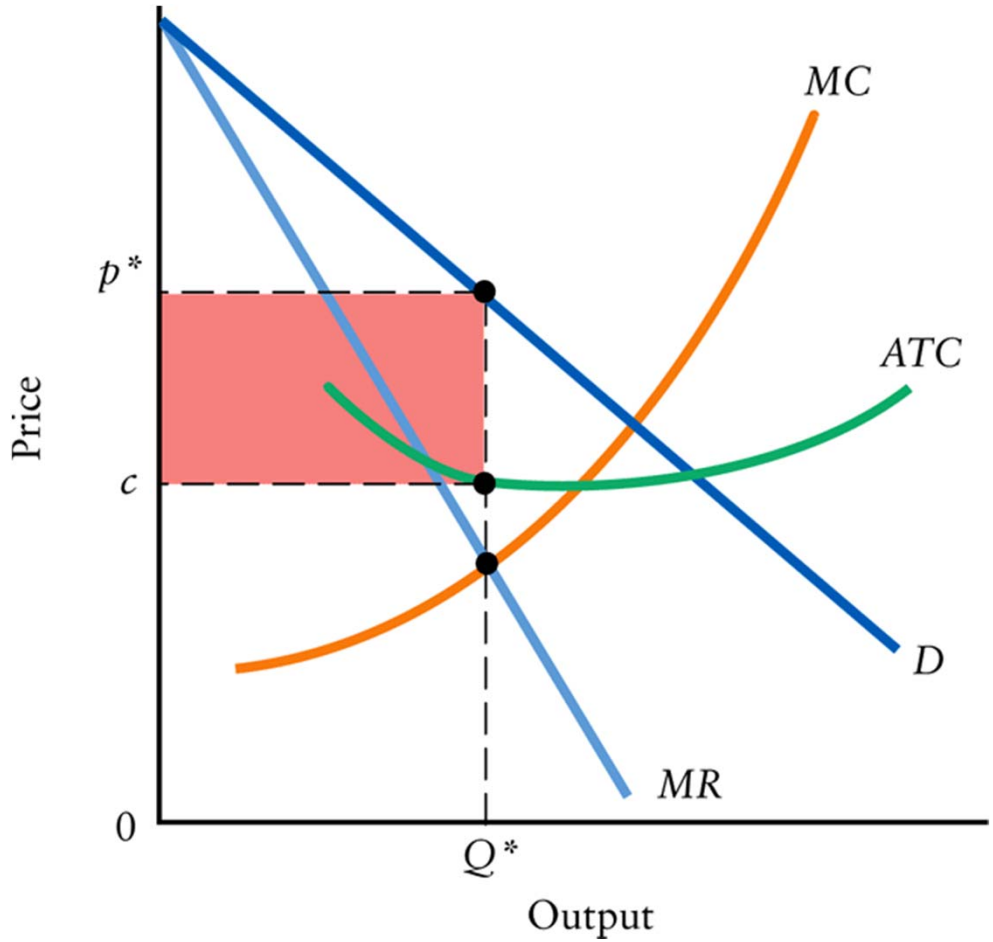
- To maximize profit, the monopolist compares marginal cost with marginal revenue.
- If marginal revenue exceeds marginal cost, De Beers increases profit by producing more; if marginal revenue is less than marginal cost, De Beers increases profit by producing less. So the monopolist maximizes its profit by using the optimal output rule:
- At the monopolist's profit-maximizing quantity of output,

$$MR = MC$$



The price De Beers can charge per diamond is found by going to the point on the demand curve directly above point *A*, (point *B* here) —a price of $600 per diamond. It makes a profit of $400 × 8 = $3,200.

Short-Run Profit Maximization for a Monopolist



Monopolist's Profit-Maximizing Behavior

There is no unique relationship between market price and the quantity of output supplied.

➔ A monopolist does not have a supply curve

The monopolist is the only producer in an industry.

➔ A monopolist is the industry.

Competition and Monopoly Compared

Unlike a competitive firm, the monopolist does not have a supply curve because it chooses its price.

The monopolist is the industry, so that its profit-maximizing conditions is the equilibrium of the industry.

In a perfectly competitive industry price equals MC. But a monopolist produces at a lower level of output, with price exceeding MC.

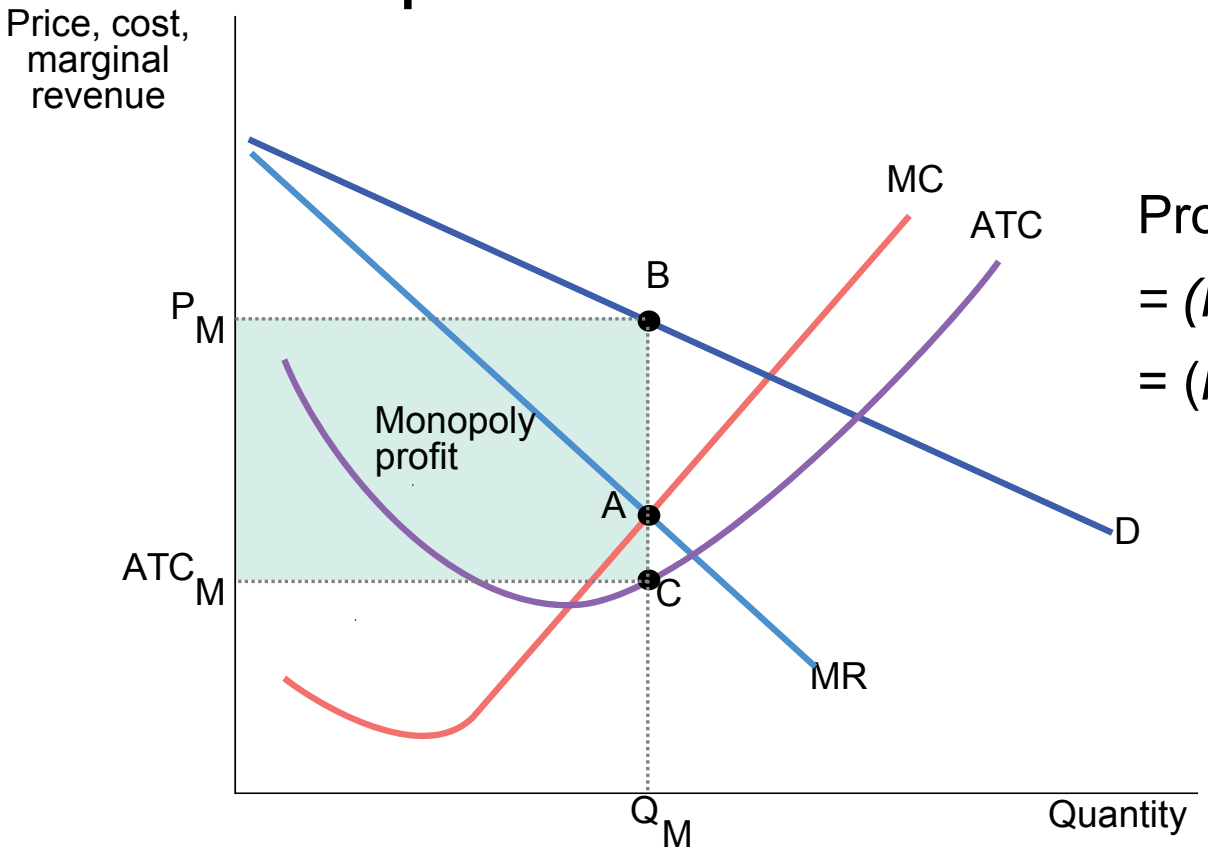
Monopoly versus Perfect Competition

- *P = MC at the perfectly competitive firm's profit-maximizing quantity of output*
- *P > MR = MC at the monopolist's profit-maximizing quantity of output*

Compared with a competitive industry, a monopolist does the following:

- Produces a smaller quantity: *QM* < QC
- Charges a higher price: *PM* > PC
- Earns a profit

The Monopolist's Profit



Profit = $TR - TC$

$= (P_M \times Q_M) - (ATC_M \times Q_M)$

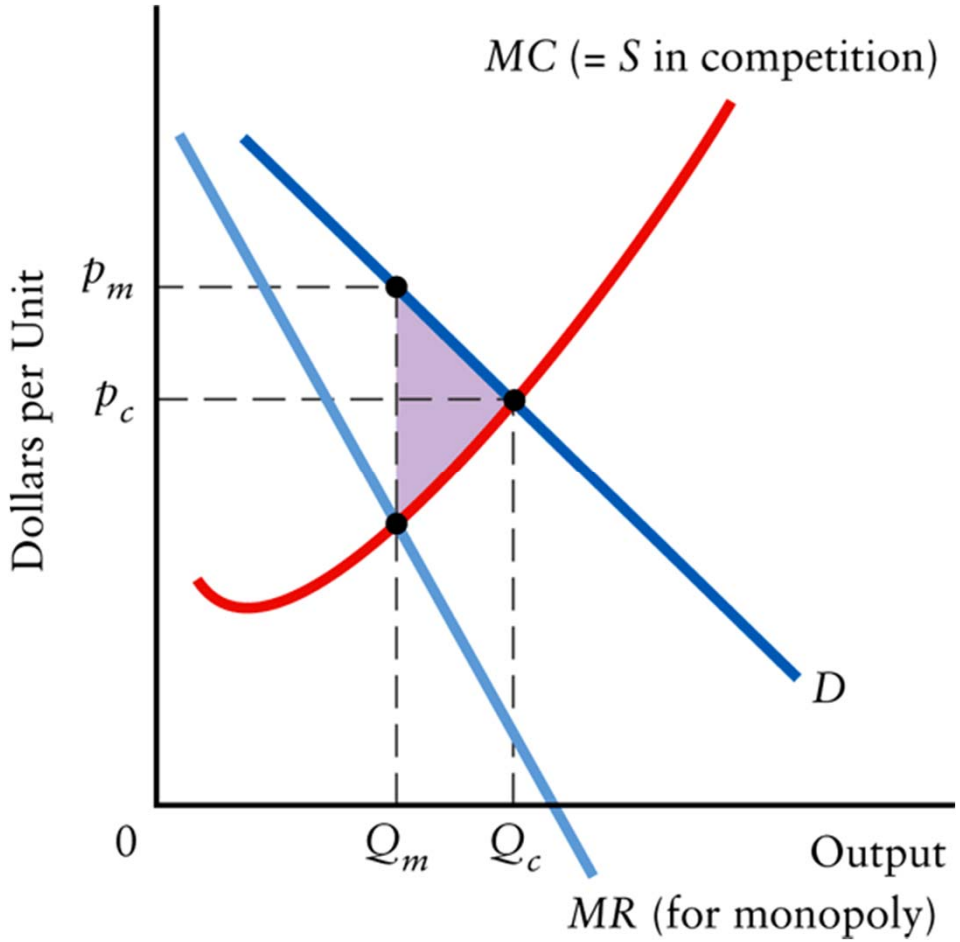
$= (P_M - ATC_M) \times Q_M$

In this case, the MC curve is upward sloping and the ATC curve is U-shaped. The monopolist maximizes profit by producing the level of output at which $MR = MC$, given by point A, generating quantity Q_M. It finds its monopoly price, P_M , from the point on the demand curve directly above point A, point B here. The average total cost of Q_M is shown by point C. Profit is given by the area of the shaded rectangle.

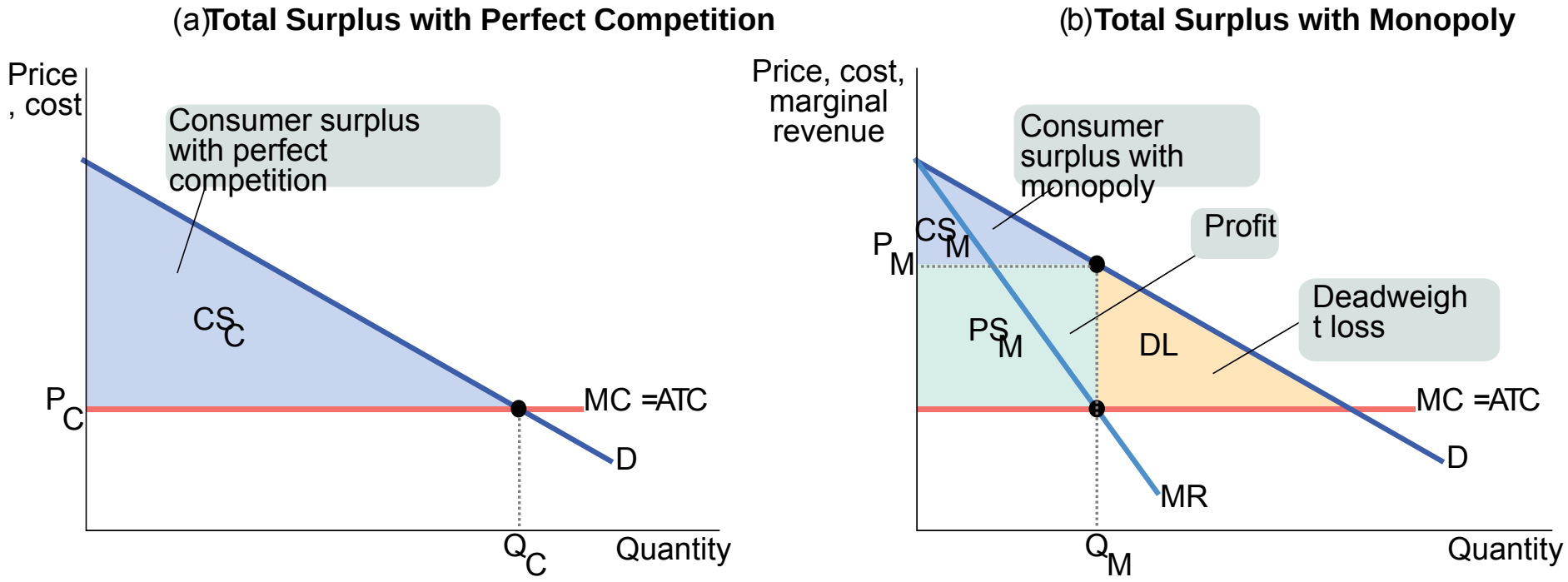
Monopoly and Public Policy

- By reducing output and raising price above marginal cost, a monopolist captures some of the consumer surplus as profit and causes deadweight loss. To avoid deadweight loss, government policy attempts to prevent monopoly behavior.
- When monopolies are “created” rather than natural, governments should act to prevent them from forming and break up existing ones.
- The government policies used to prevent or eliminate monopolies are known as *antitrust policy*.

The Inefficiency of Monopoly



Monopoly Causes Inefficiency



Panel (b) depicts the industry under monopoly: the monopolist decreases output to *QM* and charges *PM*. Consumer surplus (blue triangle) has shrunk because a portion of it is has been captured as profit (light blue area). Total surplus falls: the deadweight loss (orange area) represents the value of mutually beneficial transactions that do not occur because of monopoly behavior.

Preventing Monopoly

Dealing with Natural Monopoly

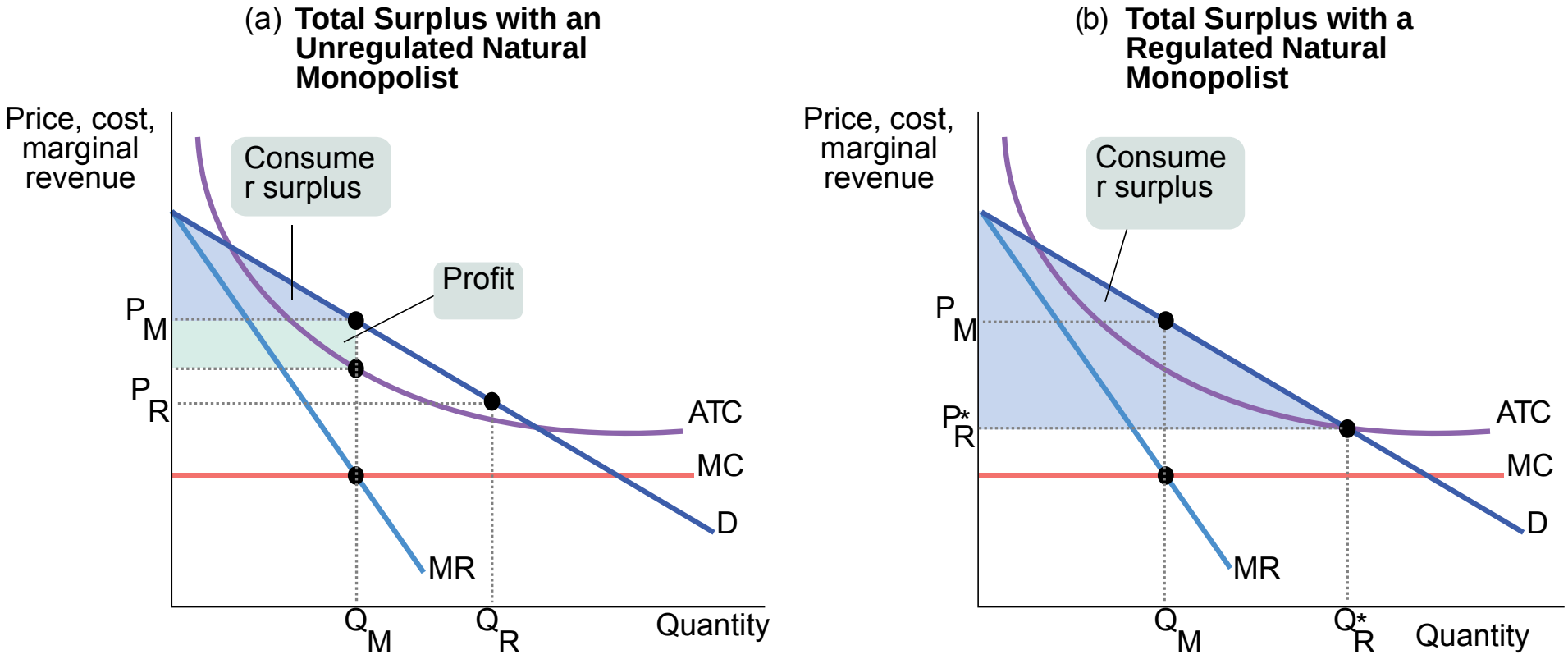
- Breaking up a monopoly that isn't natural is clearly a good idea, but it's not so clear whether a natural monopoly, one in which large producers have lower average total costs than small producers, should be broken up, because this would raise average total cost.

- Yet even in the case of a natural monopoly, a profit-maximizing monopolist acts in a way that causes inefficiency—it charges consumers a price that is higher than marginal cost, and therefore prevents some potentially beneficial transactions.

Dealing with Natural Monopoly

- What can public policy do about this? There are two common answers…
- One answer is *public ownership*, but publicly owned companies are often poorly run.
- In public ownership of a monopoly, the good is supplied by the government or by a firm owned by the government
- A common response in the United States is *price regulation*. A price ceiling imposed on a monopolist does not create shortages as long as it is not set too low.
- There always remains the option of doing nothing; monopoly is a bad thing, but the cure may be worse than the disease.

Unregulated and Regulated Natural Monopoly



Panel (b) shows what happens when the monopolist must charge a price equal to average total cost, the price P_R^*. Output expands to Q_R^*, and consumer surplus is now the entire blue area. The monopolist makes zero profit. This is the greatest consumer surplus possible when the monopolist is allowed to at least break even, making P_R^* the best regulated price.

Entry Barriers and Long-Run Equilibrium

Despite incentives to enter, effective entry barriers allow monopoly profits to persist in the long run.

Entry barriers are of two types:

- "natural" – such as economies of scale
- "created" – by advertising campaigns or
  – by government regulation

	Competition	Monopoly
Similarities		
Goal of firms	Maximize profits	Maximize profits
Rule for maximizing	MR=MC	MR=MC
Can earn economic profits in the short run?	Yes	Yes
Differences		
Number of firms	Many	One
MR	MR=P	MR<P
Price	P=MC	P>MC
Produces welfare-maximizing level of output?	Yes	No
Entry in long run?	Yes	No
Can earn economic profits in long run?	No	Yes
Price discrimination possible?	No	Yes

Source:

- Krugman, P. and Robin Wells (2008)
- Lipsey, Regan, and Storer (2008)