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Principles of Economics

Chapter 15:

Monopoly

The Big Picture

- Chapter 13: The cost of production
- Now, we will look at firm's revenue
  - But revenue depends on market structure
1. Competitive market (chapter 14)
2. Monopoly (this chapter)
3. Monopolistic Competition (chapter 16)
4. Oligopoly (chapter 17)
  - Are there other types of markets? Yes, see more advance courses in IO and firm competition

In This Chapter

- Why do monopolies arise?
- Why is $\boldsymbol{MR} < \boldsymbol{P}$ for a monopolist?
- How do monopolies choose their ***P*** and Q***?***
- How do monopolies affect society's well-being?
- What can the government do about monopolies?
- What is price discrimination?

Why Monopolies Arise

- Monopoly
  - A firm that is the sole seller of a product without close substitutes
- Has market power
  - The ability to influence the market price of the product it sells: "price maker"
- Arise due to barriers to entry
  - Other firms cannot enter the market to compete with it

Three Barriers to Entry

1. Monopoly Resources
   - A single firm owns a key resource.
     - Single water provider in town
     - DeBeers - owns most of the world's diamond mines
2. Government Regulation
   - The government gives a single firm the exclusive right to produce the good.
     - Patent and copyright laws, rice wine

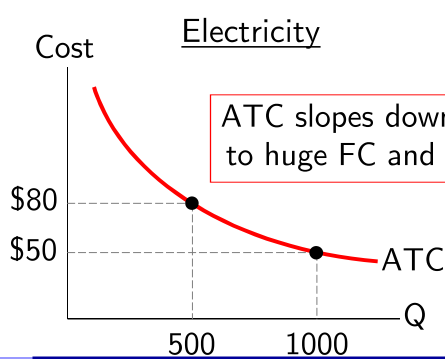
Three Barriers to Entry

3. The Production Process: Natural Monopoly
   - A single firm can produce the entire market ***Q*** at lower cost than could several firms
   - Arises when there are economies of scale over the relevant range of output
   - Distribution of water, electricity, etc.
- Note: This is about cost of production!
  - Not really market structure, so:
  - Natural monopoly need not result in a monopoly…

Example: Natural Monopoly

You live in a small town where 1,000 homes need electricity.

- ***ATC*** is lower if one firm services all 1,000 homes than if two firms each service 500 homes.

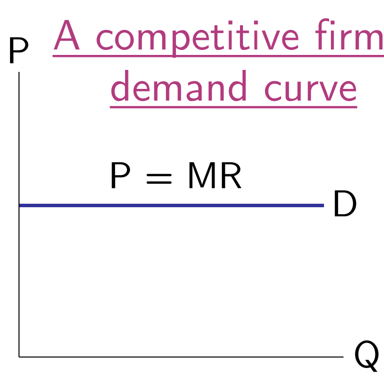


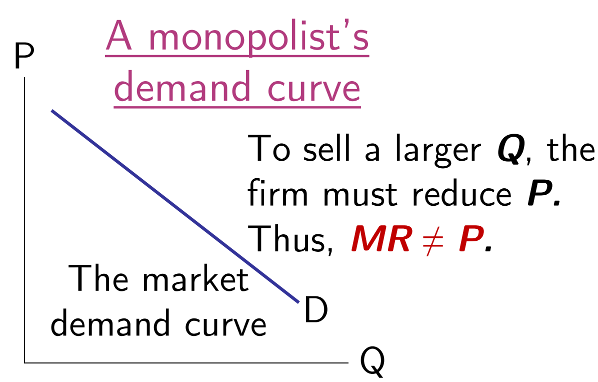
Monopoly versus Competition

- Competitive Firm
  - Price Taker
  - Small, one of many
  - Faces individual demand at ***P***: perfectly elastic demand
- Monopoly Firm
  - Price Maker,
  - Has market power
  - Faces the entire market demand: downward sloping demand

Demand Curves: Competitive Firm vs. Monopoly

The firm can increase ***Q*** without lowering ***P***, so ***MR*** = ***P*** for the competitive firm.





Active Learning 1: Hello Café (桌遊去) Revenue

Hello Café (桌遊去) is the only board game place on campus.
The table shows the market demand for game play.

- 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	$60			
1	55			
2	50			
3	45			
4	40			
5	35			
6	30			
7	25			
8	20			
9	15			
10	10			

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What is the relation between P and AR?

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Hello Café (桌遊去) is the only board game place on campus.
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What is the relation between P and MR?

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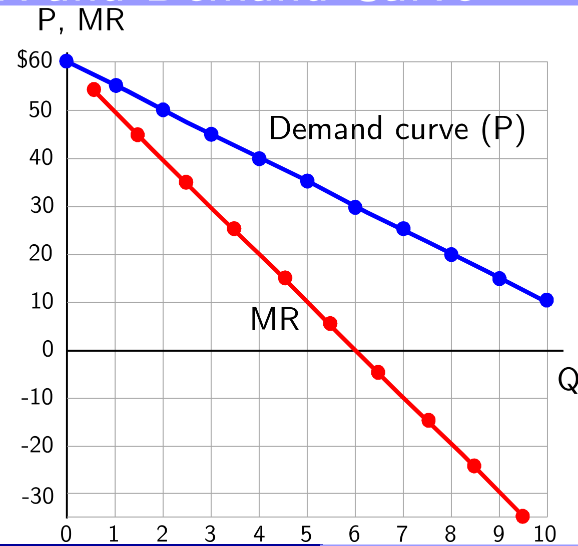
Active Learning 1: Answers

- **P = AR**, same as for a competitive firm.
- **MR < P**, whereas **MR = P** for a competitive firm.

Q	P	TR	AR	MR
0	$60	$0	n/a	
1	55	55	55	55
2	50	100	50	45
3	45	135	45	35
4	40	160	40	25
5	35	175	35	15
6	30	180	30	5
7	25	175	25	-5
8	20	160	20	-15
9	15	135	15	-25
10	10	100	10	-35

Example: Hello Café MR and Demand Curve

Q	P	MR
0	$60	
1	55	55
2	50	45
3	45	35
4	40	25
5	35	15
6	30	5
7	25	-5
8	20	-15
9	15	-25
10	10	-35



A Monopolist's Revenue

- Increasing ***Q*** has two effects on revenue:
  - Output Effect: Higher output raises revenue
  - Price Effect: Lower price reduces revenue
- Marginal Revenue, $MR < P$
  - To sell a larger ***Q***, the monopolist must reduce the price on all the units it sells
  - Is negative if price effect > output effect
    - Ex: If Hello Café increases ***Q*** from 6 to 7

Q	TR	MR
0	$0	
1	55	55
2	100	45
3	135	35
4	160	25
5	175	15
6	180	5
7	175	-5
8	160	-15
9	135	-25
10	100	-35

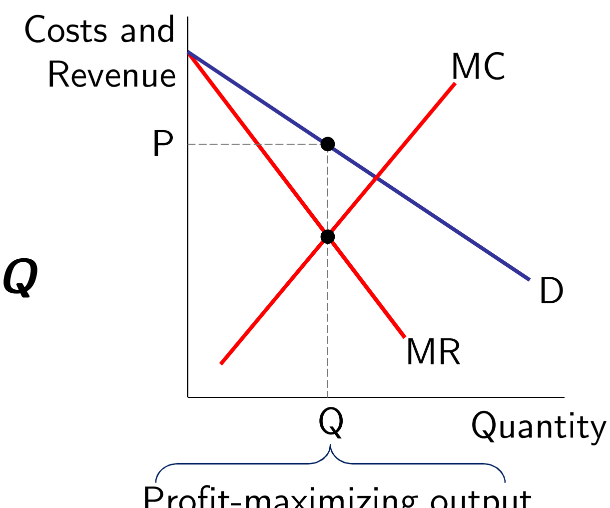
Monopoly Profit Maximization

- Produce Q where $MR = MC$
  - Sets the highest price consumers are willing to pay for that quantity
  - Finds this price on the D curve
  - $P > MR = MC$
  - If $P > ATC$, the monopoly earns a profit

Profit-Maximization for a Monopoly

At this Q, find P on the demand curve.

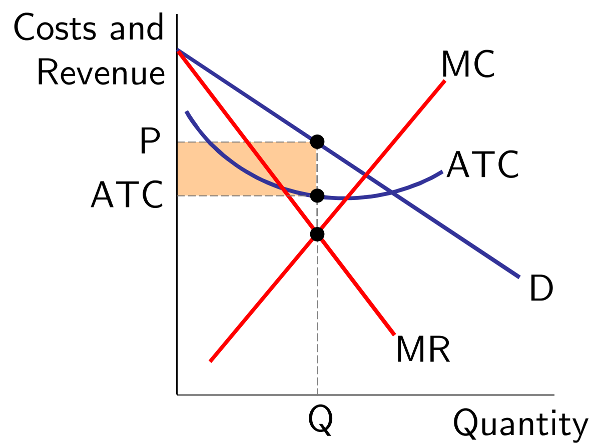
The profit-maximizing Q is where $MR = MC$.



The Monopolist's Profit

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

$(P - ATC) \times Q$



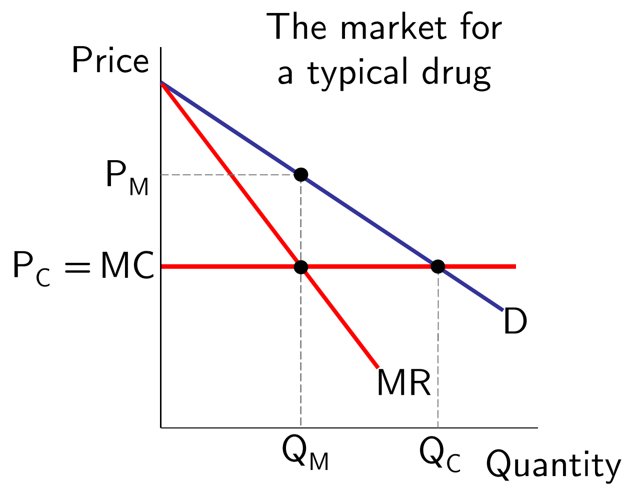
A Monopoly Does Not Have a S Curve

- 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"
  - ***Q*** does not depend on ***P***
  - ***Q*** and ***P*** are jointly determined by ***MC***, ***MR***, and the demand curve
- Hence, no supply curve for monopoly.

Case Study: Monopoly vs. Generic Drugs

Patents on new drugs give a temporary monopoly to the seller: P_M , Q_M

When the patent expires, the market becomes competitive, generics appear: P_C , Q_C

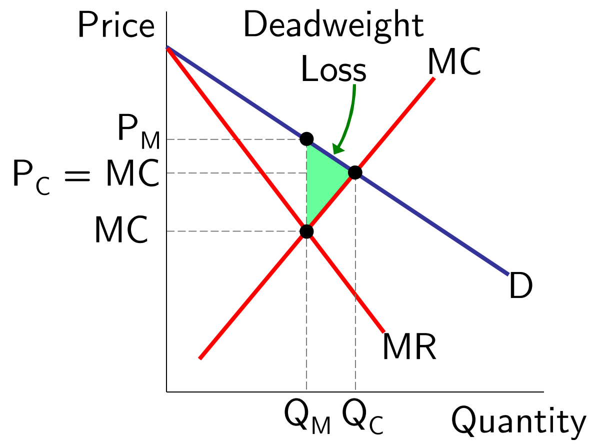


The Welfare Cost of Monopolies

- Competitive Market Equilibrium:
  - At $P = MC$ and maximizes total surplus
- Monopoly Equilibrium: at $P > MR = MC$
  - 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.
- Monopoly results in a deadweight loss

The Deadweight Loss of Monopoly

- Competitive Equilibrium:
  - Quantity $= Q_C$
  - $P_C = MC$
  - Total surplus is maximized
- Monopoly Equilibrium:
  - Quantity $= Q_M$
  - $P_M > MC$
  - Deadweight Loss



The Monopoly's Profit: A Social Cost?

- Monopoly profit is not in itself necessarily a problem for society
  - Greater producer surplus for monopoly
  - Smaller consumer surplus
  - Transfer of surplus from consumers to monopoly
- The inefficiency:
  - Monopoly produces $Q <$ efficient quantity
  - Deadweight Loss

Price Discrimination

- Price Discrimination:
  - Sell the same good at different prices to different buyers
- A firm can increase profit by charging a higher price to buyers with higher willingness to pay
  - Requires the ability to separate customers according to their willingness to pay
- Can raise economic welfare

Active Learning 2: At the Movies

You are the manager of the only movie theater in town. The price you charge is NT\$180 per ticket, and in a given week you sell $\mathbf{Q} = 1{,}000$ movie tickets. Assume that you incur only a fixed cost of NT\$100,000 in a week.

A. How much profit is the movie theater making?

B. If you are dropping the price to NT\$50, you will be able to sell $\mathbf{Q} = 2{,}500$ movie tickets. Calculate the profit.

C. Suggest a way you can price discriminate when selling movie tickets. Calculate the profit if you price discriminate with $\mathbf{P_1}$ = NT\$180 and $\mathbf{P_2}$ = NT\$50.

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You are the manager of the only movie theater in town. The price you charge is NT\$180 per ticket, and in a given week you sell $Q = 1{,}000$ movie tickets. Assume that you incur only a fixed cost of NT\$100,000 in a week.
How much profit is the movie theater making?

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You are the manager of the only movie theater in town. The price you charge is NT\$180 per ticket, and in a given week you sell $Q = 1{,}000$ movie tickets. Assume that you incur only a fixed cost of NT\$100,000 in a week.
If you are dropping the price to NT\$50, you will be able to sell $Q = 2{,}500$ movie tickets. Calculate the profit.

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You are the manager of the only movie theater in town. The price you charge is NT$180 per ticket, and in a given week you sell Q = 1,000 movie tickets. Assume that you incur only a fixed cost of NT$100,000 in a week.
Calculate the profit if you price discriminate with P1 = NT$180 and P2 = NT$50.

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Active Learning 2: Answers

A. Single price **P** = $180, **Q** = 1,000, **TC** = $100,000
- Total Revenue **TR** = **P** × **Q** = $180,000
- Profit = **TR** – **TC** = $80,000

B. Single price **P** = $50, **Q** = 2,500, **TC** = $100,000
- Total Revenue **TR** = **P** × **Q** = $125,000
- Profit = **TR** – **TC** = $25,000

C. Price Discrimination: $\mathbf{P_1}$ = $180 and $\mathbf{P_2}$ = $50.
- Sell **Q** = 1,000 at $\mathbf{P_1}$, so $\mathbf{TR_1}$ = $180,000
- Sell **Q** = (2,500 – 1,000) at $\mathbf{P_2}$, so $\mathbf{TR_2}$ = $75,000
- Profit = $\mathbf{TR_1}$ + $\mathbf{TR_2}$ – **TC** = $155,000

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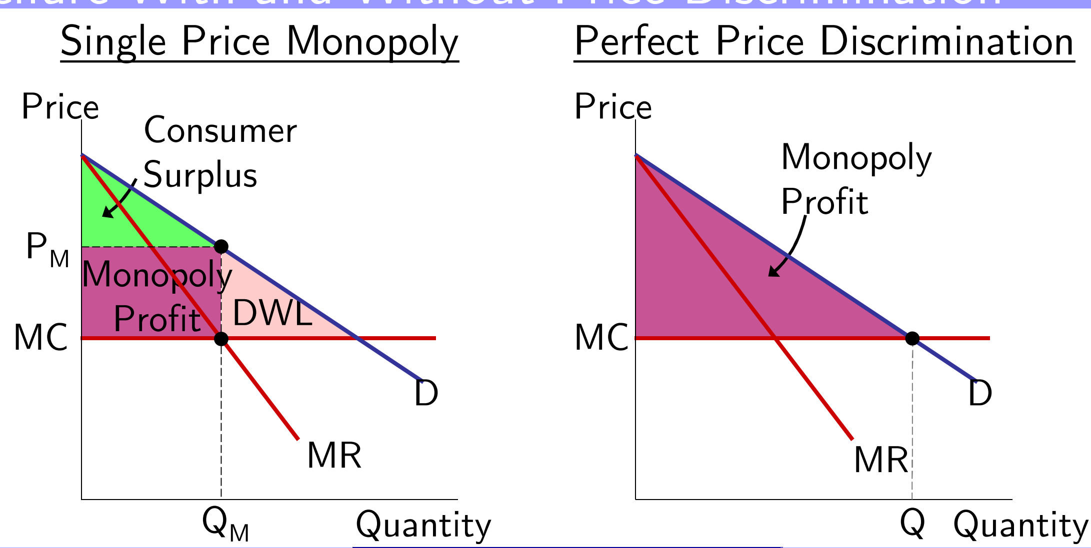
Perfect Price Discrimination

- Perfect Price Discrimination
  - Charge each customer a different price
    - Exactly his or her willingness to pay
- Monopoly firm gets the entire surplus (Profit)
- No deadweight loss

Welfare With and Without Price Discrimination



Price Discrimination in the Real World

- Perfect price discrimination is not possible since
  - No firm knows every buyer's ***WTP***
  - Buyers do not reveal it to sellers
- Price Discrimination
  - Firms divide customers into groups based on some observable trait that is likely related to willingness to pay (***WTP***), such as age

Example: Price Discrimination

A. Movie Tickets
   - Discounts for seniors, students, and people who can attend during weekday afternoons.
   - Lower ***WTP*** than people who pay full price on Friday night

B. Airline Prices
   - Discounts for Saturday-night stayovers
   - Business travelers (higher ***WTP***) vs. more price-sensitive leisure travelers

Example: Price Discrimination

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

D. 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

Example: Price Discrimination

E. Quantity Discounts
- A buyer's WTP often declines with additional units, so firms charge less per unit for large quantities than small ones.
- Ex: Vieshow Cinemas charges NT$89 for a small popcorn, NT$106 for medium one that's twice as big, and NT$115 for a large one that is thrice as big.

全台威秀爆米花價格

	單點爆米花
台北 信義威秀 / 京站威秀	大杯爆米花：$115 中杯爆米花：$106 小杯爆米花：$89
板橋 大遠百威秀	
林口 三井	
桃園 統領威秀	
新竹 大遠百威秀	
頭份 尚順威秀	
新竹 巨城威秀	

Public Policy Toward Monopolies

1. Increasing Competition with Antitrust Laws
   - Sherman Antitrust Act, 1890
   - Clayton Antitrust Act, 1914
- Prevent mergers
- Break up companies
- Prevent companies from coordinating their activities to make markets less competitive

Ask The Experts
Mergers

- "A merger of AT&T and Time Warner would likely increase consumer surplus over the ensuing decade."
- Do you Agree or Disagree?
- Do you think Economists Agree or Disagree?

Source: IGM Economic Experts Panel, August 28, 2013, November 8, 2016.

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Do you agree or disagree?
"A merger of AT&T and Time Warner would likely increase consumer surplus over the ensuing decade."

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Do you think economists agree or disagree?
"A merger of AT&T and Time Warner would likely increase consumer surplus over the ensuing decade."

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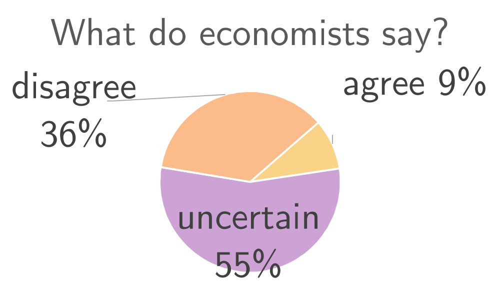
Ask The Experts
Mergers

- "A merger of AT&T and Time Warner would likely increase consumer surplus over the ensuing decade."



Source: IGM Economic Experts Panel, August 28, 2013, November 8, 2016.

Public Policy Toward Monopolies

2. Regulation
   - Set the monopolists' price
   - Common in case of natural monopolies
     - **MC** < **ATC** at all **Q**
     - Marginal-cost pricing would result in losses
   - Regulator might subsidize the monopolist or set **P** = **ATC** for zero economic profit
   - Problem: no incentive to reduce costs

Public Policy Toward Monopolies

3. Public Ownership
   - How the ownership of the firm affects the costs of production
     - Example: USPS, Taiwan CPC, TTL
- Private Owners: incentive to min costs
- Public Owners (government):
  - If it does a bad job, losers are the customers and taxpayers
  - Public ownership is usually less efficient since there is no profit incentive to minimize costs

Public Policy Toward Monopolies

4. Doing Nothing
   - Some economists argue that it is often best for the government not to try to remedy the inefficiencies of monopoly pricing
   - Determining the proper role of the government in the economy requires judgments about politics as well as economics
5. Auction Off the Market (Harold Demsetz)
   - Can use revenue to subsidize consumers
     - Pigovian Subsidy: Correct for DWL

The Prevalence of Monopoly

- Pure monopoly – rare in the real world
- Many firms have market power, due to:
  - Selling a unique variety of a product
  - Having a large market share and few significant competitors
- In many such cases, most of the results from this chapter apply, including:
  - Markup of price over marginal cost
  - Deadweight Loss

Competition versus Monopoly

		Competition	Monopoly
Similarities	Goal of firms	Maximize profits	Maximize profits
	Rule for maximizing	MR = MC	MR = MC
	Can earn economic profits in SR?	Yes	Yes
Differences	Number of firms	Many	One
	Marginal revenue	MR = P	MR < P
	Price	P = MC	P > MC
	Produces welfare-maximizing Q?	Yes	No
	Entry in the LR?	Yes	No
	Can earn economic profits in LR?	No	Yes
	Price discrimination possible?	No	Yes

Ask The Experts
Mergers

- "If regulators had not approved mergers in the past decade between major networked airlines, travelers would be better off today."

- Do you Agree or Disagree?

- Do you think Economists Agree or Disagree?

Source: IGM Economic Experts Panel, August 28, 2013, November 8, 2016.

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Do you Agree or Disagree?
"If regulators had not approved mergers in the past decade between major networked airlines, travelers would be better off today."

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Do you think Economists Agree or Disagree?
"If regulators had not approved mergers in the past decade between major networked airlines, travelers would be better off today."

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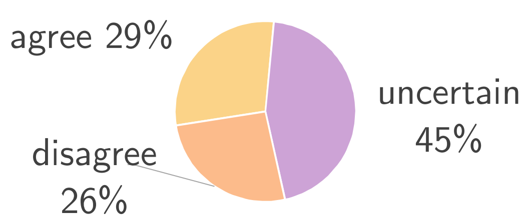
Ask The Experts
Mergers

- "If regulators had not approved mergers in the past decade between major networked airlines, travelers would be better off today."

What do economists say?



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Think-Pair-Share
A Consumer Advocate is Discussing the Airline Industry

...on the news. He says, "There are so many rates offered by airlines that it is technically possible for a 747 to be carrying a full load of passengers where no two of them paid the same price for their tickets. This is clearly unfair and inefficient."

- He continues, "In addition, the profits of the airlines have doubled in the last few years since they began this practice, and these additional profits are clearly a social burden.

Think-Pair-Share
A Consumer Advocate is Discussing the Airline Industry

...We need legislation that requires airlines to charge all passengers on an airplane the same price for their travel."

A. List some of the ways airlines divide their customers according to their willingness to pay.
B. Is it necessarily inefficient for airlines to charge different prices to different customers? Why or why not?
C. Is the increase in profits generated by this type of price discrimination a social cost? Explain.

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List some of the ways airlines divide their customers according to their willingness to pay.

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Is it necessarily inefficient for airlines to charge different prices to different customers? Why or why not?

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Is the increase in profits generated by this type of price discrimination a social cost? Explain.

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Chapter In A Nutshell

- Monopoly: the sole seller in its market.
- Monopoly arises when:
  - A single firm owns a key resource
  - The government gives a firm the exclusive right to produce a good
  - A single firm can supply the entire market at a lower cost than many firms could.
- Monopoly faces a downward-sloping demand curve for its product: **MR** $<$ **P**

2021/12/7 Monopoly Joseph Tao-yi Wang

Chapter In A Nutshell

- Monopoly maximizes profit
  - Produce **Q** where **MR** = **MC**, but **Q** is not efficient
  - For this **Q**, the price is on the demand curve.
  - So P > MR = **MC**
  - Causes deadweight loss
- Price Discrimination: charge different prices for the same good based on a buyer's willingness to pay.
  - Can raise economic welfare by getting the good to some consumers who would otherwise not buy it.

Chapter In A Nutshell

- Perfect Price Discrimination
  - No deadweight loss
  - Entire surplus goes to the monopoly producer
- Policymakers can:
  - Use antitrust laws to try to make the industry more competitive
  - Regulate the prices that the monopoly charges
  - Turn the monopolist into a government-run enterprise
  - Do nothing at all
  - Or, just auction off the market (Demsetz, 1968)

Chapter 15: Monopoly

- **MR** = **MC** to maximize profit (still true!)
- But, **P** > **MR** (**D** - downward sloping)
- Welfare Cost of a Monopoly:
  - Profits (unfair?) vs. DWL (efficiency loss!)
- Cures? Do nothing?
  - Auction off the market!
- Homework: Mankiw, Ch.15, Problem 5-11

Challenge Questions (Past Finals)

- 2007 - Part 1
- 2008 - Essay D
- 2009 - Essay A
- 2018 - Essay B4-B5
- 2019 - Essay B9-B10

- True or False. Monopolists can achieve any level of profit they desire because they have unlimited market power.
- True or False. Heavy competition among firms for a limited number of customers leads to such devices as discounts for students and senior citizens.

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Audience Q&A Session

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Principles of Economics

Ch.15:

The End