Lecture 12: Pricing Strategies

November 14, 2023

Course Administration

- 1. Use Numbers 3 graded next week
- 2. Two more lectures: Externalities and public goods
- 3. Final Dec. 13 and 14
- 4. Any questions?

Ripped from the Headlines

Next week – article due by Wednesday midnight

Finder Presenter
Tara Jared



Ripped from the Headlines

Finder Presenter

Jared Trenton

Where We Are Going

- Pricing strategy basics
- Perfect price discrimination
- Segmenting
- Indirect price discrimination
- Bundling
- Ex. 1: Taylor Swift and Ticketmaster debacle
- Ex. 2: Gas stations in Los Angeles



Pricing Strategy Basics

So far, we have studied

- perfectly competitive firms
 - set *P* = *MC*
- firms with market power that charge the same price for all consumers
 - set MR = MC, and $MR \neq P$

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• why?

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why? to make more money!

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Today, we let firms charge different prices to different consumers

- why? to make more money!
- price discrimination \equiv "the practice of charging different prices to different consumers of the same product"

Why Do We Care About These Strategies?

- Helps us understand firm behavior
- Which illuminates scope for policy

Why Do We Care About These Strategies?

- Helps us understand firm behavior
- Which illuminates scope for policy
- Prices can differ because of
 - cost differences → "price differences"
 - ullet offering different products can also o "price differences"
 - market power and pricing strategies → "price discrimination"
 - there is legal and illegal price discrimination
- Allows us to differentiate between legal and illegal differences in price



1. Market power

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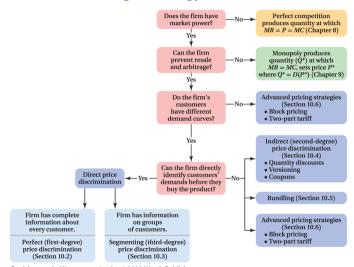
ullet \equiv when a firm has the ability to influence the market price



- 1. Market power
 - \equiv when a firm has the ability to influence the market price
- 2. Firm must be able to prevent resale

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 - ullet \equiv when a firm has the ability to influence the market price
- 2. Firm must be able to prevent resale
 - because resale allows the pricing strategy to break down

Pricing Strategy Overview



Goolsbee et al., Microeconomics, 3e, © 2020 Worth Publishers



Logical Organization of Discussion

For each pricing strategy

- 1. Strategy requirements
- 2. Strategy definition
- 3. Examples
- 4. Consumer and producer surplus implications

Perfect Price Discrimination Or, First Degree Price Discrimination

Requirements for Perfect Price Discrimination

- 1. Firm has market power and can prevent resale
- 2. Firm's customers have different demand curves
- 3. Firm knows each customer's demand and can identify customers

Perfect Price Discrimination

- Charge each customer their willingness to pay for each unit
- If your demand curve slopes downward, what does this mean?
 - High price for first units
 - Lower prices for later units

Examples of Perfect Price Discrimination

Actually pretty hard in real life

College tuition



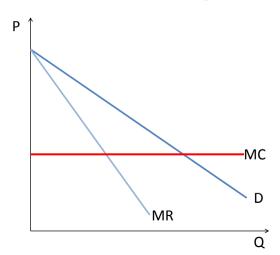
Examples of Perfect Price Discrimination

Actually pretty hard in real life

- College tuition
- Things you buy on ebay
- Fine art auctions

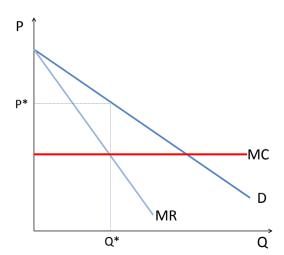
Recall Producer and Consumer Surplus with Market Power

Where is the Profit Maximizing P and Q?

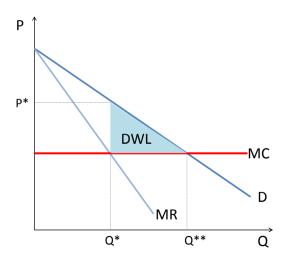


Recall Producer and Consumer Surplus with Market Power

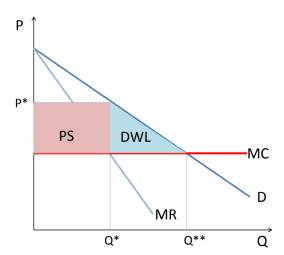
Where are the Trades that Don't Take Place?



Recall Producer and Consumer Surplus with Market Power Where is PS?

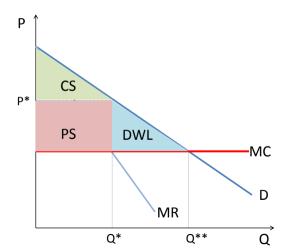


Recall Producer and Consumer Surplus with Market Power Where is CS?



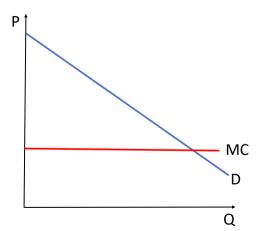
Recall Producer and Consumer Surplus with Market Power

Consumers Worse Off, Producers Better Off



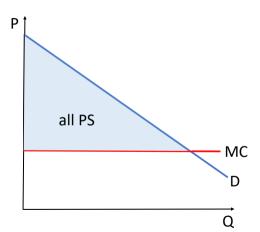
What is Producer Surplus With Perfect Price Discrimination?

Here is a firm with market power, facing downward sloping demand



What is Producer Surplus With Perfect Price Discrimination?

Firm scoops up every last bit of surplus



Regime DWL? CS PS

Perfect competition

Regime DWL? CS PS
Perfect competition none entirely none



Regime DWL? CS PS

Perfect competition none entirely none
Market power, no price discrimination

Regime	DWL?	CS	PS
Perfect competition	none	entirely	none
Market power, no price discrimination	yes	some	some

Regime	DWL?	CS	PS
Perfect competition Market power, no price discrimination	none yes	entirely some	none some
Market power, perfect price discrimination			

The Extent of Deadweight Loss

Regime	DWL?	CS	PS
Perfect competition	none	entirely	none
Market power, no price discrimination	yes	some	some
Market power, perfect price discrimination	none	none	entirely



Segmenting Or, Third Degree Price Discrimination

Requirements for Price Discrimination via Segmenting

- 1. Firm has market power and can prevent resale
- 2. Firm's customers have different demand curves
- 3. Firm can identify group demand for the product and can identify group members before purchase; it cannot identify individual demand

Price Discrimination via Segmenting

- Charge a different price to different segments of the market
- Firm identifies segments via observable attributes



Price Discrimination via Segmenting

- Charge a different price to different segments of the market
- Firm identifies segments via observable attributes

Why does the firm need to prevent resale?

By customer characteristics

- By customer characteristics
 - student discount
 - business travelers vs leisure travelers



- By customer characteristics
 - student discount
 - business travelers vs leisure travelers
- By past purchase behavior

- By customer characteristics
 - student discount
 - business travelers vs leisure travelers
- By past purchase behavior
 - new consumer discount for high switching cost industries
 - existing consumer discount when existing consumer sensitivity is high



- By customer characteristics
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- By location
 - if price sensitivity differs
 - see gas stations



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- Over time



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 - business travelers vs leisure travelers
- By past purchase behavior
 - new consumer discount for high switching cost industries
 - existing consumer discount when existing consumer sensitivity is high
- By location
 - if price sensitivity differs
 - see gas stations
- Over time
 - are you the first to buy a new iphone?



Why Segment?

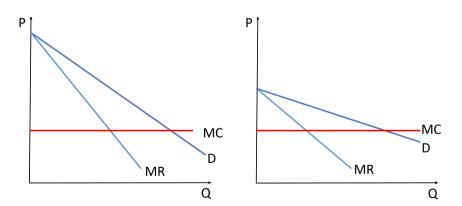
Why Segment? To Make More Money!

Basic strategy

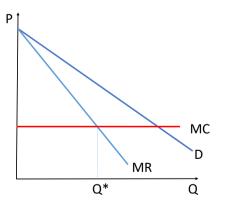
- identify groups
- find marginal revenue of groups
- ullet set marginal revenue = marginal cost to get π maximizing quantity
- charge price from demand curve at this quantity

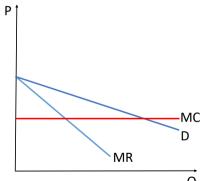


What is profit maximizing Q for higher valuation, less elastic consumers?

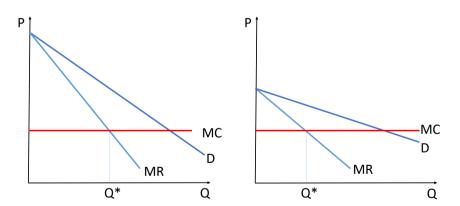


What is profit maximizing Q for lower valuation, more elastic consumers?

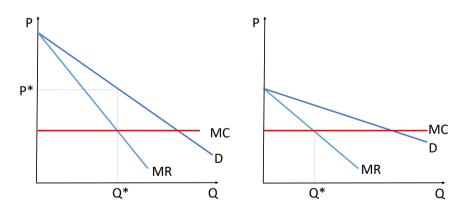




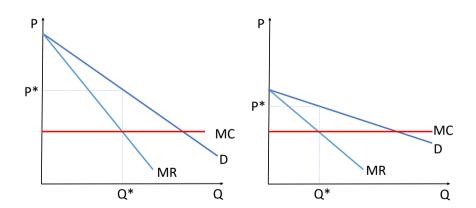
What is profit maximizing P for higher valuation, less elastic consumers?



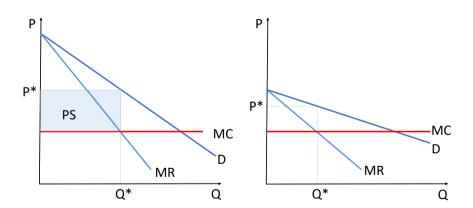
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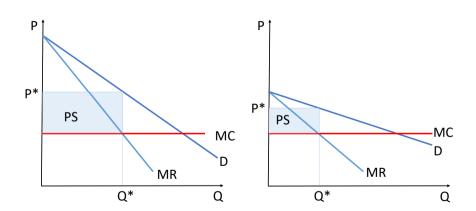
What is *PS* for lower valuation, more elastic consumers?



What is *PS* for lower valuation, more elastic consumers?



Firm gains surplus from segmenting market





What Does this Mean for Producer Surplus?

- By focusing on each group separately, the firm makes more profits
- Otherwise it would have to charge some intermediate price

Note that we omit discussion of pricing with Lerner index.



Indirect Price Discrimination Or, Second Degree Price Discrimination

Requirements for Price Discrimination via Segmenting

- 1. Firm has market power and can prevent resale
- 2. Firm's customers have different demand curves
- 3. Firm cannot identify customers' demand before purchase

Two Types of Indirect Price Discrimination

- 1. Quantity discounts
- 2. Versioning

What is a Quantity Discount?

- Pay less if you buy more
- Works only if
 - "customers who purchase larger quantities of a product have relatively more elastic demands than consumers who buy smaller quantities" and
 - the plan is incentive compatible
- Can you think of such an example?

When a Plan is Incentive Compatible

 $\mbox{incentive compatibility} \equiv \mbox{a plan such that the price offered to each group is chosen by that group}$



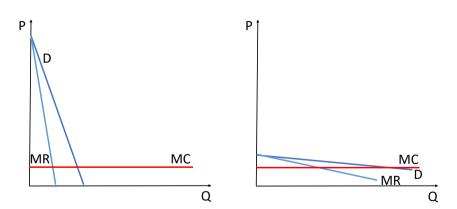
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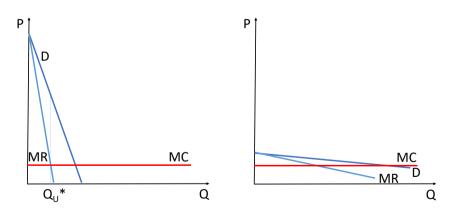
Example?

- bread at the bakery in the morning
- same bread at closing, heavily discounted

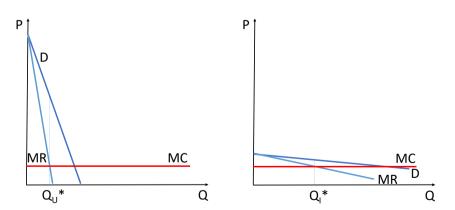
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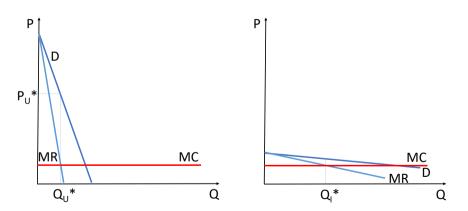
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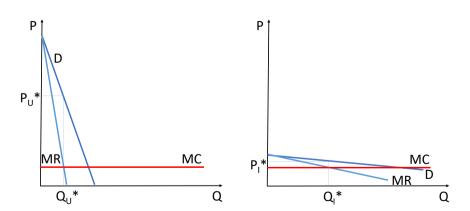
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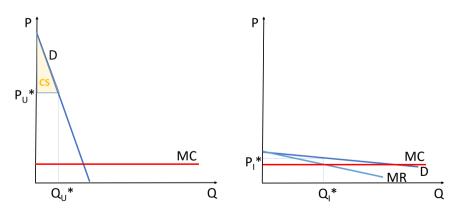
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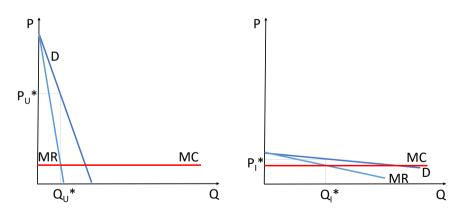
Quantity Discount: Buy Q_I or more units, pay P_I . Otherwise, pay P_U .



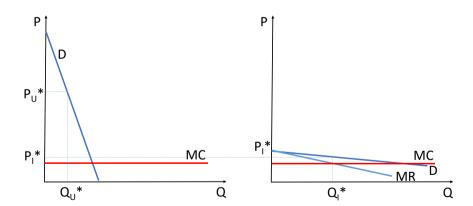
Original CS for More Inelastic Consumers



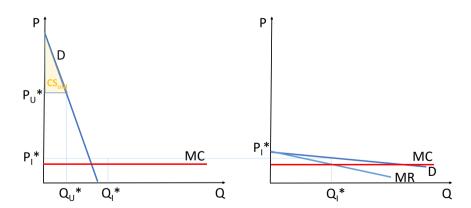
Would right panel customers ever want to pay P_{II}^* ?



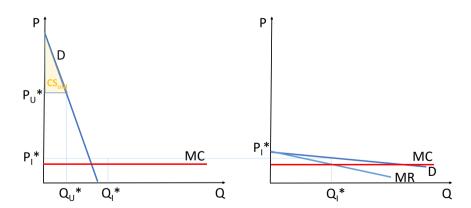
Would Left Panel Consumers Want to Pay P_l if They Must Buy Q_l ?



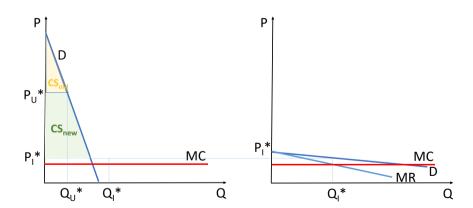
Reminder: Consumers Always Get This Surplus



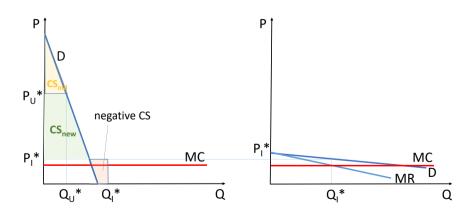
What Additional Surplus Do They Get at P_l ?



What About the Requirement to Purchase Q_l ?



Incentive Compatible?



Summary of Logical Steps

How to find π maximizing price with market power

- 1. Find MR
- 2. Find Q^* where MR = MC
- 3. Find P^* from demand curve

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Is it incentive compatible?

- For each group, find CS under proposed plan
- For each group, find CS if they choose non-targeted plan



Summary of Logical Steps

How to find π maximizing price with market power

- 1. Find MR
- 2. Find Q^* where MR = MC
- 3. Find P^* from demand curve

Is it incentive compatible?

- For each group, find CS under proposed plan
- For each group, find CS if they choose non-targeted plan
- Find which *CS* is larger
 - if $CS_{targeted} > CS_{non-targeted} \Rightarrow$ incentive compatible
 - if $CS_{targeted} < CS_{non-targeted} ⇒$ incentive compatible



In-Class Problem: Implementing Pricing Strategy, 1 of 2

Suppose you have a convenience store that sells soft drinks and has market power. You have two types of consumers: high demanders, with $P_H=0.35-\frac{1}{100}\,Q_H$ and low demanders with $P_L=0.25-\frac{1}{100}\,Q_L$, where Q is in ounces. There are no fixed costs and marginal cost is \$0.05 per ounce of soda.

- 1. If you can determine which type is which, what price will you charge each type?
 - 1.1 find π maximizing Q
 - 1.2 find *P*
- 2. What pricing strategy is this?
- 3. How much profit do you make for each consumer type? Many thanks to Oregon State for this problem.

Answer: When You Can Segment

Low demanders: find MR, set = MC

$$MR = \frac{1}{4} - \frac{1}{50}Q$$

$$MR = MC$$

$$\frac{5}{100} = \frac{1}{4} - \frac{1}{50}Q$$

$$Q = 10$$

Then find price, in demand curve

$$P = \frac{1}{4} - \frac{1}{100}Q$$

$$= \frac{1}{4} - \frac{1}{100}10$$

$$= \frac{15}{100}$$

$$= \frac{15}{100}$$

Answer: When You Can Segment

Low demanders: find MR, set = MC High demanders: find MR, set = MC

$$MR = \frac{1}{4} - \frac{1}{50}Q$$

$$MR = MC$$

$$\frac{5}{100} = \frac{1}{4} - \frac{1}{50}Q$$

$$Q = 10$$

$$MR = \frac{35}{100} - \frac{1}{50}Q$$

$$MR = MC$$

$$\frac{5}{100} = \frac{35}{100} - \frac{2}{100}Q$$

$$Q = 15$$

Then find price, in demand curve

$$P = \frac{1}{4} - \frac{1}{100}Q$$

$$= \frac{1}{4} - \frac{1}{100}10$$

$$= \frac{15}{100}$$

Then find price, in demand curve

Answer: Profit per Customer

Low demanders,
$$P = 0.15$$
, $Q = 10$

$$\pi = PQ - (MC)Q$$

$$= (0.15)(10) - 10(0.05)$$

$$= 1$$

Answer: Profit per Customer

Low demanders,
$$P = 0.15$$
, $Q = 10$

$$\pi = PQ - (MC)Q$$

$$= (0.15)(10) - 10(0.05)$$

High demanders,
$$P = 0.20$$
, $Q = 15$

$$\pi = PQ - (MC)Q$$

$$= (0.20)(15) - (0.05)(15)$$

$$= 3 - 0.75$$

$$= 2.75$$



In-Class Problem: Implementing Pricing Strategy, 2 of 2

Suppose you have a convenience store that sells soft drinks and has market power. You have two types of consumers: high demanders, with $P_H=0.35-\frac{1}{100}Q_H$ and low demanders with $P_L=0.25=\frac{1}{100}Q_L$, where Q is in ounces. There are no fixed costs and marginal cost is \$0.05 per ounce of soda.

Now suppose you can't tell which type is which!

- 1. Suppose you charge the high price to everyone. How many ounces do you sell per customer?
- 2. What quantity discount can you offer to segment the market?
- 3. Draw a picture to show whether the firm could gain surplus, relative to the high price, by offering a quantity discount.

Many thanks to Oregon State for this problem.



In-class Problem Answers

- 1. Suppose you charge the high price to everyone. How many ounces do you sell per customer?
 - High guys same as before
 - · Low guys: plug into demand curve

$$P_{L} = \frac{25}{100} - \frac{1}{100} Q_{0}$$

$$\frac{20}{100} = \frac{25}{100} - \frac{1}{100} Q_{0}$$

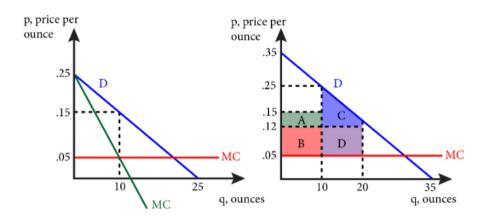
$$Q = 5$$

Does that make sense?

- 2. What quantity discount can you offer to segment the market?
 - For Q > 10, we need to charge a little less than \$0.15 if you buy 20 ounces
- 3. Draw a picture to show whether the firm could gain surplus, relative to the high price, by offering a quantity discount. next page!



Picture for Surplus



Versioning

 $versioning \equiv$

"pricing strategy in which the firm offers different product options designed to attract different types of consumers"

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"pricing strategy in which the firm offers different product options designed to attract different types of consumers"

Examples?



Versioning

versioning \equiv

"pricing strategy in which the firm offers different product options designed to attract different types of consumers"

Examples?

- different airline restrictions but not classes, which is a different product
- new editions of existing software

Implications?

• firm makes more profit by dividing the market



Bundling

Requirements for Price Discrimination via Bundling

- 1. Firm has market power and can prevent resale
- 2. A firm sells a secondary product and consumers' demand for that product is negatively correlated with their demand for the first product

What is Bundling?

- Selling more than one product together for a single price
- What do you buy in bundles?

	ESPN	truTV	bundle
Madison	\$9.00	\$1.00	\$10.00
Dakota	\$10.00	\$1.50	\$11.50

	ESPN	truTV	bundle
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- Assume MC = 0
- Max π without bundling?

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- Assume MC = 0
- Max π without bundling?
 - find highest price for each product
 - add up total profit

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- Assume MC = 0
- Max π without bundling?
 - find highest price for each product
 - add up total profit 2(\$9.00) + 2(\$1.00) = \$20
- Max π with bundling?

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- Assume MC = 0
- Max π without bundling?
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- Max π with bundling?
 - find highest price for bundle
 - add up total profit



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- Max π without bundling?
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- Max π with bundling?
 - find highest price for bundle
 - add up total profit 2(\$10.00)



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- Assume MC = 0
- Max π without bundling?
 - find highest price for each product
 - add up total profit 2(\$9.00) + 2(\$1.00) = \$20
- Max π with bundling?
 - find highest price for bundle
 - add up total profit 2(\$10.50) = \$21



Mixed Bundling

Call our previous strategy "pure bundling". What is mixed bundling?

- Sell products as a bundle
- And sell them individually



Mixed Bundling

Call our previous strategy "pure bundling". What is mixed bundling?

- Sell products as a bundle
- And sell them individually

When is this a good idea?

 "when the marginal cost of producing some of the components is high relative to consumers' willingness to pay"



Ticketmaster Strategies for Taylor Swift Tickets

Taylor Swift's first tour in four years went on sale last year

- Verified fan program
 - weeks before sale date, give name, email and phone
 - verify buyers' identity through media
 - get codes for fan-only presale
 - purchase tix \$40 to \$449
- Additional VIP packages: \$199 to \$899
- Preferential access to those with a Capital One card
- Dynamic pricing: "The performer negotiates, through a representative, how many seats will be priced dynamically and what Ticketmaster will charge for them."

Thanks to WSJ, Nov. 15, 2022, and The New Republic on dynamic pricing.



What are these strategies?

What are these strategies?

Segmenting

What are these strategies?

- Segmenting
 - pre-sale sorts those with inelastic demand from elastic deman
- Trying to approach perfect price discrimination
 - dynamic pricing

Reporter speaks to customers at a very expensive gas station. They say

• "Because I'm on the clock and using a company card and I'm delivering to a client, I'm just using whatever's closest," he said, "but if I was using my own personal card, Costco's the only way to go."



Gas

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 - suggests segmenting or price discrimination



Gas

Bundling

Gas -00

On Variation in Gas Prices in LA

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- "Because I'm on the clock and using a company card and I'm delivering to a client, I'm just using whatever's closest," he said, "but if I was using my own personal card, Costco's the only way to go."
 - suggests segmenting or price discrimination
- "high traffic congestion can drive anyone to choose the closest option rather than iourney off into the unknown."



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 - suggests segmenting or price discrimination
- "high traffic congestion can drive anyone to choose the closest option rather than journey off into the unknown."
 - pure bundling? distance + gas price



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- "Because I'm on the clock and using a company card and I'm delivering to a client, I'm just using whatever's closest," he said, "but if I was using my own personal card, Costco's the only way to go."
 - suggests segmenting or price discrimination
- "high traffic congestion can drive anyone to choose the closest option rather than journey off into the unknown."
 - pure bundling? distance + gas price
- Owner is mostly a gas station consultant: "The majority of his revenue comes from the convenience store, not gasoline sales; even at the prices he charges, he said, gas has a fairly low profit margin compared with snacks and drinks, once upkeep, labor costs and taxes are factored in."



Reporter speaks to customers at a very expensive gas station. They say

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Gas

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 - mixed bundling
 - note: probably negative economic profits when we include land value



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Gas 000

Recap of Today

- Pricing strategy basics
- Perfect price discrimination
- Segmenting
- Indirect price discrimination
- Bundling
- Ex. 1: Taylor Swift and Ticketmaster debacle
- Ex. 2: Gas stations in Los Angeles

Next Class

- No class next week
- Public goods and externalities
- Part of Chapter 17
- Part of reading packet
- Public good podcasts