4.3 — Pricing Strategies

ECON 306 · Microeconomic Analysis · Spring 2020

Ryan Safner
Assistant Professor of Economics

谕 safner@hood.edu
偠 ryan@ryansafner.com
偠 microS20.classes.ryansafner.com
Outline

1st-Degree Price Discrimination

3rd-Degree Price Discrimination

2nd-Degree Price Discrimination

Is Price Discrimination Good or Bad?

Tying and Bundling
Any firm with market power seeks to maximize profits

- Wants to (1st) **create** a surplus
Any firm with market power seeks to maximize profits.

Wants to (1st) **create** a surplus and then **extract** some of it as profit.

- i.e. convert \( CS \rightarrow \pi \)

Consumers are *still* better off than without the firm because it creates value (consumer surplus).

- Just not as *best*-off as under perfect competition.
Most Firms Create More Value than They Can Capture!

“We conclude that [about 2.2%] of the social returns from technological advances over the 1948-2001 period was captured by producers, indicating that most of the benefits of technological change are passed on to consumers rather than captured by producers,” (p.1)

The most obvious way to capture more surplus is to raise prices. But Law of Demand suggests this would turn many customers away!

Instead, if firm could charge different customers with different WTP different prices for the same goods, firm could convert more consumer surplus into profit.

“Price discrimination” or “Variable pricing”
Two conditions are required for a firm to engage in variable pricing:

1) **Firm must have market power**

- A competitive firm must charge the market price
The Economics of Pricing Strategy I

- Two conditions are required for a firm to engage in variable pricing:

  1) Firm must have market power
     - A competitive firm must charge the market price

  2) Firms must be able to prevent resale or arbitrage
     - Clever customers buy in your lower-price market to resell it in your higher-price market
The Economics of Pricing Strategy II

- Firm *must acquire information* about the variations in its customers' demands
- Can the firm identify consumers' demands *before* they buy the product?
A firm's optimal pricing strategy is determined by characteristics of the firm, its product, and its consumers. In particular, a firm takes into account its degree of market power, whether the product can be resold, and its knowledge of its customers' demand for the product.

**Figure 10.1 An Overview of Pricing Strategies**

- **Does the firm have market power?**
  - Yes → Perfect competition produces quantity at which \( MR = P = MC \) (Chapter 8)
  - No → Can the firm prevent resale and arbitrage?
    - Yes → Monopoly produces quantity \( Q^* \) at which \( MR = MC \), sets price \( P^* \) where \( Q^* = D(P^*) \) (Chapter 9)
    - No → Do the firm's customers have different demand curves?
      - Yes → Advanced pricing strategies (Section 10.6)
        - Block pricing
        - Two-part tariff
      - No → Direct price discrimination
- **Can the firm directly identify customers' demands before they buy the product?**
  - Yes → Firm has complete information about every customer.
    - Perfect (first-degree) price discrimination (Section 10.2)
  - No → Firm has information on groups of customers.
    - Segmenting (third-degree) price discrimination (Section 10.3)
- **Indirect (second-degree) price discrimination (Section 10.4)**
  - Quantity discounts
  - Versioning
  - Coupons
- **Bundling (Section 10.5)**
The Economics of Pricing Strategy IV

- With **perfect information**  ➞  **Perfect**
  or 1st-degree price discrimination

- **Charge a different price to each customer** (their max WTP)
The Economics of Pricing Strategy V

- With **imperfect information** \(\rightarrow\) **3rd-degree price discrimination**

- Separate customers into groups (by demand differences) and charge each group a different price
2^{nd}-degree price discrimination: More indirect forms of pricing: tying, bundling, quantity-discounts

- Firm does not have enough information to categorize customers into groups
- Consumers self-select into their own group
1st-Degree Price Discrimination
If firm has *perfect information* about every customer’s demand before purchase:

- **Perfect or 1st-degree price discrimination**: firm charges *each* customer their maximum willingness to pay
  - “walks” down the market demand curve customer by customer
Firm converts *all* consumer surplus into profit!

- Produces the competitive amount \((q_c)\)!
1st-Degree Price Discrimination: Example

**TABLE 14.1 Price Discrimination at Williams College, 2001-2002**

<table>
<thead>
<tr>
<th>Income Quintile</th>
<th>Family Income Range</th>
<th>Net Price After Financial Aid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>$0–$23,593</td>
<td>$1,683</td>
</tr>
<tr>
<td>Lower Middle</td>
<td>$23,594–$40,931</td>
<td>$5,186</td>
</tr>
<tr>
<td>Middle</td>
<td>$40,932–$61,397</td>
<td>$7,199</td>
</tr>
<tr>
<td>Upper Middle</td>
<td>$61,398–$91,043</td>
<td>$13,764</td>
</tr>
<tr>
<td>High</td>
<td>$91,044+</td>
<td>$22,013</td>
</tr>
</tbody>
</table>

*Note: Students who did not apply for financial aid paid $32,470.*

Big Data and Perfect Price Discrimination
3rd-Degree Price Discrimination
Firms almost never have perfect information about their customers

But they can often separate customers by observable characteristics into different groups with similar demands before purchasing.
Firms **segment** the market or engage in **3rd-degree price discrimination** by charging different prices to different *groups* of customers.

By far the most common type of price-discrimination.
Consider airlines: different groups of travelers have different demands & price elasticities
The firm could charge a **single price** to all travelers and earn some **profit**.
With different prices: raise price on inelastic travelers, lower price on elastic travelers, earn *more profit*!
3rd-Degree Price Discrimination: Examples I

Don't forget my...

SENIOR DISCOUNT

10%

STUDENT DISCOUNT
3rd-Degree Price Discrimination: Examples II

**SCHICK HYDRO SILK:** $9.97

**SCHICK HYDRO 5:** $8.56
3rd-Degree Price Discrimination: Examples III

$1,348.50
Same day

$982.64
30 days

$100.00
90 days

$124.50
60 days

$156.89
7 days

$546.79
21 days

$756.89
12 days

$443.21
7 days

$256.78
90 days

$435.00
16 days

$234.56
5 days

$97.89
same day
3rd-Degree Price Discrimination: Examples IV
Pricing and Markup

- How much should each segment be charged?
- Firm treats each segment as a *different* market
  1. Find $q^*$: $MR(q) = MC(q)$
  2. Raise $p^*$ to maximum WTP (Demand)
- Lerner index implies optimal markup for each segment, again:

$$\frac{p - MC(q)}{p} = -\frac{1}{\epsilon}$$

Markup % of Price
Example: Suppose you run a bar in downtown Frederick, and estimate the nightly demands for beer from undergraduates \((U)\) and graduates \((G)\) to be:

\[ q_U = 18 - 4p_U \]
\[ q_G = 12 - p_G \]

Assume the only cost of producing a beer is a constant marginal (and average) cost of $2.

1. If your bar could not price discriminate, how much profit would the bar earn?

2. If you could price discriminate, how much profit would the bar earn?
Ways to Segment Markets

- By customer characteristics
  - Age
  - Gender
- Past purchase behavior
  - repeat customers (more price sensitive)
- By location
  - local demand characteristics
2\textsuperscript{nd}-Degree Price Discrimination
$2^{nd}$-Degree Price Discrimination I

- If firm cannot identify customers' demands or types before purchase

- **Indirect** or $2^{nd}$-degree price discrimination: firm offers difference price-quantity bundles and allows customers self-select their offer

- Ex: **quantity-discounts** or **block pricing**
  - Larger quantities offered at lower prices
Is Price Discrimination Good or Bad?
Ideal competitive market, $q^*$ where

$$p^c = MC$$
Is Price Discrimination Good or Bad? I

- Ideal competitive market, $q^c$ where $p^c = MC$

- A pure monopolist would produce less $q^m$ at higher $p^m$
  - reduce consumer surplus and create deadweight loss

- Transfer of some surplus from consumers to producers
Is Price Discrimination Good or Bad? I

- A price-discriminating monopolist transfers MORE surplus from consumers to producers
- But encourages monopolist to produce more than the pure monopoly level and reduce deadweight loss!
  - At best, also produces at competitive output level!
Price-discrimination creates incentives for innovation and risk-taking.

Firms with high fixed costs of investment earn great profits, can recover their fixed costs.

Might not do so without ability to price-discriminate.
As with markups in general, price discrimination has everything to do with price elasticity of demand.

If you are paying too much and losing consumer surplus, the real "problem" is that your demand is very inelastic.

- fewer options, a particular brand, or a necessity, limited time, etc

If you want to pay less, buy generic (more elastic)
How to Be a Savvy Consumer

- Realize that any “sales” and “discounts” are calculated to make the store more money.
- But it can make you better off as a consumer too if you are smart.
- Think about your consumer surplus!
- If you were already planning to buy the product, a fall in price is a good deal for you.
  - Your demand is less elastic.
- If you weren’t going to buy the product before, and now you do, the sale was effective for the store, and you likely don’t get much surplus.
  - Your demand is more elastic.
Behavioral Economics

$25
$5 shipping

$30
Free shipping
Price discrimination is selling *identical* goods to people at different prices.

But not everytime people pay different prices means it is price discrimination.

Sometimes it is truly different goods that people are paying different prices for.

- If *costs* to firm are *different* for different versions (color, size, etc.), it is a *different* good, *not* price discrimination.
Price Discrimination vs. Price Differences

- **Example**: bottled sparkling water often more expensive than Coca Cola
  - Could be because sparkling water drinkers have more elastic demand than Coke drinkers
  - Or could be that it is more expensive to package sparkling water (economies of scale with greater number of Coke drinkers)
Price Discrimination vs. Price Differences

- The only way to tell the difference is to see what happens if demand changes price elasticity (and costs do not change)
  - Price discrimination requires market power, firm with market power marks up price based on $\frac{1}{\epsilon}$
  - Competitive firm only sets $p = MC$, so change in elasticity has no effect on price

- See today’s class notes for a graphical demonstration
Tying and Bundling
Firms often tie multiple goods together, where you must buy both goods in order to consume the product.

- One good often the "base" and the other are "refills" that you may need to buy more of.

This is actually a method of *intertemporal price-discrimination*!
• Companies often sell printers at marginal cost (no markup) and sell the ink/refills at a much higher markup

• Reduce arbitrage:
  ○ printer requires specific ink
  ○ ink only words with that specific printer
Tying II

- Segment the market into:

1. **High-volume users**: buy more ink over time; pay more per sheet printed

2. **Low-volume users**: buy less ink; pay less per sheet printed

- **Indirect** price-discrimination: firms don't know what kind of user you are in advance
Tying: Good or Bad?

- Again, a tradeoff:
- Increased profits and reduced consumer surplus, reduced deadweight loss
- Spreads fixed cost of research & development over more users
Tying: Good or Bad?

- If printers & ink were **not** tied:
  - printers would be **more expensive**
  - ink would be **cheaper**

- High-volume users would keep buying ink and save money (vs. tied)

- Low-volume users might not buy the (now expensive) printer at all!
Firms often bundle products together as a single package, and refuse to offer individual parts of the package. Often, consumers do not want all products in the bundle. Or, if they were able to buy just part of the bundle, they would not buy the other parts.
Example: Consider two consumers, each have different reservation prices to buy components in Microsoft Office bundle

<table>
<thead>
<tr>
<th></th>
<th>Amy's WTP</th>
<th>Ben's WTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS Word</td>
<td>$70</td>
<td>$40</td>
</tr>
<tr>
<td>MS Excel</td>
<td>$50</td>
<td>$60</td>
</tr>
</tbody>
</table>

- Microsoft could charge separate prices for MS Word and MS Excel
**Example:** Consider two consumers, each have different reservation prices to buy components in Microsoft Office bundle

<table>
<thead>
<tr>
<th></th>
<th>Amy's WTP</th>
<th>Ben's WTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS Word</td>
<td>$70</td>
<td>$40</td>
</tr>
<tr>
<td>MS Excel</td>
<td>$50</td>
<td>$60</td>
</tr>
</tbody>
</table>

- Microsoft could charge separate prices for MS Word and MS Excel
- MS Word: both would buy at $40, generating $80 of revenues
Example: Consider two consumers, each have different reservation prices to buy components in Microsoft Office bundle.

<table>
<thead>
<tr>
<th></th>
<th>Amy's WTP</th>
<th>Ben's WTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS Word</td>
<td>$70</td>
<td>$40</td>
</tr>
<tr>
<td>MS Excel</td>
<td>$50</td>
<td>$60</td>
</tr>
</tbody>
</table>

- Microsoft could charge separate prices for MS Word and MS Excel.
- MS Word: both would buy at $40, generating $80 of revenues.
- MS Excel: both would buy at $50, generating $100 of revenues.
Example: Consider two consumers, each have different reservation prices to buy components in Microsoft Office bundle.

<table>
<thead>
<tr>
<th></th>
<th>Amy's WTP</th>
<th>Ben's WTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS Word</td>
<td>$70</td>
<td>$40</td>
</tr>
<tr>
<td>MS Excel</td>
<td>$50</td>
<td>$60</td>
</tr>
</tbody>
</table>

- Microsoft could charge separate prices for MS Word and MS Excel.
  - MS Word: both would buy at $40, generating $80 of revenues.
  - MS Excel: both would buy at $50, generating $100 of revenues.
- Total revenues of individual sales: $180.
**Example:** Consider two consumers, each have different reservation prices to buy components in Microsoft Office bundle

<table>
<thead>
<tr>
<th></th>
<th>Amy's WTP</th>
<th>Ben's WTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS Word</td>
<td>$70</td>
<td>$40</td>
</tr>
<tr>
<td>MS Excel</td>
<td>$50</td>
<td>$60</td>
</tr>
<tr>
<td>Bundle</td>
<td>$120</td>
<td>$100</td>
</tr>
</tbody>
</table>

- Microsoft could charge separate prices for MS Word and MS Excel
- MS Word: both would buy at $40, generating $80 of revenues
- MS Excel: both would buy at $50, generating $100 of revenues
- Total revenues of individual sales: $180
- Microsoft can instead add their individual reservation prices and bundle products together to force both consumers to buy both products
- **Bundle:** both buy at $100, generating $200 revenue
Bundling: Good or Bad?

- Again, a tradeoff:
  - Increased profits and reduced consumer surplus, reduced deadweight loss
  - Spreads fixed cost of research & development over more users
  - Goods with high fixed costs and low marginal costs (software, TV, music) increase profits from bundling
    - increases innovation and investment in these industries