2. Price Discrimination

- Practise of selling the same product to distinct consumers at different prices
- Examples:
  - Tram tickets bought together pay a per-trip bonus
  - Musea tickets are cheaper for senior citizens
  - Children train fares are cheaper than adult fares
  - Film tickets are cheaper when bought on the viewer-day
  - Plane tickets are cheaper with a Saturday-night stay
  - Different EuroDisney visitors pay a distinct per-ride price
• Rationale for price discrimination: *capture extra surplus*

\[
\text{Economic Surplus not appropriated by the seller!}
\]

 Price Discrimination

• First Degree (or perfect)
  – Personalised pricing
    • Each buyer pays the maximum price is willing to

• Third Degree (group pricing)
  – Observe a group signal and charge different prices to different groups

• Second degree (contracts menu, versioning)
  – Offer a menu of price-quantity bundles and let consumers choose among them
First-Degree or Perfect Price Discrimination

- Practice of charging each consumer the maximum amount he or she will pay for each incremental unit
- Permits a firm to extract all surplus from consumers
- Two illustrations:
  - Consumers are different and have inelastic demands
  - Consumers are have downward sloping demands

**Case I: Personalized pricing**

\[ P = 10 - 2Q \]

**Profits**: \(6 + 4 + 2 = \$12\)

**Total Cost**: \$6

[Graph showing the relationship between price, quantity, and profits]
Case II: Two-part tariffs

1. Set price at marginal cost.
2. Compute consumer surplus.
3. Charge a fixed-fee equal to consumer surplus.

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Price</th>
<th>Per Unit Charge</th>
<th>Fixed Fee = Profits = $16</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Caveats with perfect price discrimination

- Even though it leads to an efficient outcome, what is a fair distribution of wealth in the society?
- In practice, transactions costs and information constraints make it difficult to implement perfectly (but car dealers and some professionals try to come close!).
- Price discrimination won’t work if consumers can resell the good (arbitrage opportunities)
- Consumers may try to resist it:
Third Degree Price Discrimination

- The practice of charging different groups of consumers different prices for the same product
- Examples:
  - Journals, software [institutions, individuals, students]
  - International pricing [IKEA products]
  - Physicians [rich and poor patients]

Implementing Third Degree Price Discrimination

- Suppose the total demand for a product is comprised of two groups with different elasticities, $\varepsilon_1 < \varepsilon_2$
- Note that group 1 is more price sensitive than group 2
- Profit-maximizing prices? Treat groups as separate markets
  - $P_1 = \left[\frac{\varepsilon_1}{1+\varepsilon_1}\right] \times MC$
  - $P_2 = \left[\frac{\varepsilon_2}{1+\varepsilon_2}\right] \times MC$

Notice that $P_1 > P_2$
Welfare aspects of third degree price discrimination

- Ambiguous in general
  - If group pricing leads to the “opening of markets,” then there is potential for welfare increases. (⇒)
  - A necessary (but not sufficient) condition for group pricing to increase welfare is that it increases output. If the increase is quite large, welfare gains will result.
  - When demands are very different across groups, consumption shifts may lead to welfare losses. (⇐)

Welfare aspects of group pricing

Group pricing leads to a welfare gain!
Welfare aspects of group pricing

Group pricing leads to a welfare loss!

Caveats with third degree price discrimination

- In practice, the seller needs to be able to observe the characteristics of different consumers.
- Price discrimination won’t work if consumers can resell the good.
Second Degree Price Discrimination

- The practice of offering a menu of contracts intended to sort out consumers of different types
- Examples:
  - Insurance companies, airlines, utilities (water, electricity, telephony), etc.

2nd Degree Price Discrimination at work; linear two-part tariffs

Linear two part tariff: \( T = A + pq \)
Charge \( p^* = c \)
Charge fixed fee \( A = CS_1(c) \)
2nd Degree Price Discrimination at work; Non-linear two-part tariffs: still better

Prices of some brand-name pharmaceutical drugs rise when generics enter the market!

- Patent expires
- Entry occurs, prices should fall
- No, Grabowski and Vernon (1992)
  - Brand-name drugs price up by 7%
  - Average price falls by 10%
- Elderly and Retired 15% less likely to switch that adults in general
- Before -> uniform price
- After: different prices-product combination for different segments
  - Elderly: lower elasticity, high price
  - Adults: higher elasticity, lower price.
Other mechanisms to capture consumer surplus

- Block Pricing
- Tying and bundling
- Versioning

Block Pricing

- The practice of packaging multiple units of a product together and selling them as one package.
- Examples
  - Paper
  - Six-packs of drinks
  - Season cards and one-year subscriptions
  - Different sizes of cans of green beans
Tying

• The practice of conditioning the sale of one good on the purchase of another good.
• Examples
  – Manufacturer of machines tying repair-service contracts (car producers)
  – Franchises tying the use of its brand name to the purchase of the franchise inputs
    • Kodak case: tied supply of parts of photocopiers with repair services

Example, tying

• A monopolist in a primary market offers a menu of contracts attempting to gain market power in a secondary market (aftermarket)
• Offer menu:
  – \{A_1,p_1\} intended for low-demand consumers
  – \{A_2,p_2,\text{Repair contract}\} intended for high-demand consumers
Commodity Bundling

- Bundling refers to tying in fixed proportions
- The practice of bundling two or more products together and charging one price for the bundle
- Examples
  - Vacation packages
  - Computers and software
  - Film and developing

Example of Bundling

<table>
<thead>
<tr>
<th># Type consumers</th>
<th>MS Word</th>
<th>MS Excel</th>
</tr>
</thead>
<tbody>
<tr>
<td>300 Economists</td>
<td>20</td>
<td>5</td>
</tr>
<tr>
<td>300 Managers</td>
<td>5</td>
<td>22</td>
</tr>
<tr>
<td>300 Engineers</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>100 Others</td>
<td>14</td>
<td>14</td>
</tr>
</tbody>
</table>
### Optimal Price for Word

<table>
<thead>
<tr>
<th>Type</th>
<th>MS Word</th>
<th>MS Excel</th>
</tr>
</thead>
<tbody>
<tr>
<td>300 Economists</td>
<td>20</td>
<td>5</td>
</tr>
<tr>
<td>300 Managers</td>
<td>5</td>
<td>22</td>
</tr>
<tr>
<td>300 Engineers</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>100 Others</td>
<td>14</td>
<td>14</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Price</th>
<th>Demand</th>
<th>$\pi$</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>1,000</td>
<td>3,000</td>
</tr>
<tr>
<td>5</td>
<td>700</td>
<td>3,500</td>
</tr>
<tr>
<td>14</td>
<td>400</td>
<td>5,600</td>
</tr>
<tr>
<td>20</td>
<td>300</td>
<td>6,000</td>
</tr>
</tbody>
</table>

Optimal price!

### Optimal Price for Excel

<table>
<thead>
<tr>
<th>Type</th>
<th>MS Word</th>
<th>MS Excel</th>
</tr>
</thead>
<tbody>
<tr>
<td>300 Economists</td>
<td>20</td>
<td>5</td>
</tr>
<tr>
<td>300 Managers</td>
<td>5</td>
<td>22</td>
</tr>
<tr>
<td>300 Engineers</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>100 Others</td>
<td>14</td>
<td>14</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Price</th>
<th>Demand</th>
<th>$\pi$</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>1,000</td>
<td>4,000</td>
</tr>
<tr>
<td>5</td>
<td>700</td>
<td>3,500</td>
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<tr>
<td>14</td>
<td>400</td>
<td>5,600</td>
</tr>
<tr>
<td>22</td>
<td>300</td>
<td>6,600</td>
</tr>
</tbody>
</table>

Optimal price!
### Optimal Price for Pure Bundling

<table>
<thead>
<tr>
<th>Type</th>
<th>MS Word</th>
<th>MS Excel</th>
<th>MS Excel+Word</th>
</tr>
</thead>
<tbody>
<tr>
<td>800 Economists</td>
<td>20</td>
<td>5</td>
<td>25</td>
</tr>
<tr>
<td>300 Managers</td>
<td>5</td>
<td>22</td>
<td>27</td>
</tr>
<tr>
<td>300 Engineers</td>
<td>3</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>100 Others</td>
<td>14</td>
<td>14</td>
<td>28</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Price</th>
<th>Demand</th>
<th>( \pi )</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>1,000</td>
<td>6,000</td>
</tr>
<tr>
<td>25</td>
<td>700</td>
<td>17,500</td>
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<tr>
<td>27</td>
<td>400</td>
<td>10,800</td>
</tr>
<tr>
<td>28</td>
<td>100</td>
<td>2800</td>
</tr>
</tbody>
</table>

But 17,500 is more than 6,000+6,600=12,600! Better to bundle!

---

### Optimal Price for Mixed Bundling

Offer Word at 20 and get 6,000  
Offer Excel at 22 and get 6,600  
Offer Excel+Word at 28 and get 2800

Total profit increases too!
Versioning

- Second degree *quality* discrimination
- Examples:
  - 1st class/2nd class train tickets
  - Business class/economy class airfares
  - Hardcover/paperback books
  - Damaged goods

Versioning: principles

- Same principles as 2nd degree price discrimination:
  - Offer versions tailored to the needs of different customers [participation]
  - Accentuate the differences between the versions [incentive-compatibility, self-selection]
Many dimensions to Exploit

- Delay [book publishers, post services, stock quotes]
- User interface [Dialogweb, DataStar]
- Image resolution [Photodisk]
- Speed of operation [Mathematica]
- Capability [Kurzweil]
- Features and functions [Quicken]
- Customer support

Caveat: often versioning leads to social welfare wastes

- Create a high-end version intended for the highest willingness-to-pay buyers
- Degrade the product to be offered for low-willingness-to-pay buyers
Legal aspects to price discrimination

- **US:** *Unlawful* if it substantially hurts *competition* or tends to create monopoly
  - Price discrimination in input supply
  - Tying is explicitly forbidden
- **EU:** *Unlawful* if it substantially hurts users and consumers, unfair pricing.