Outline

1. Origins of Monopoly
2. Monopolistic Behaviours
3. Limits of Monopoly Power
4. Price Discrimination
5. Application of Monopoly Theory
6. Total Cost of Monopoly
7. Pricing Strategies of Firms
Why is There Only One Seller?

- Ownership of a rare resource (diamond, rare earth, mountain gorilla, etc.)
- Intellectual property rights — trade marks, patents, copyrights
- Exclusive franchise — one cable or phone company in a city
- Branding — Rolex watches, Prada, LV
- Trade secret — Unique recipe, advanced technology
- Network effect — keyboard design, computer operating systems
- High fixed cost — economies of scale
Profits Maximization

- The monopoly faces the market demand curve. Therefore it is a price searcher looking for the price-quantity combination that maximizes economic profit.
- The necessary condition is still marginal cost equals to marginal revenue, \( MC = MR \).
- For a monopolist, marginal revenue is not equal to market price.
- Our assumption is that the firm has to charge the same price to all customers.
- Therefore if it want to sell one more unit of the product, it has to reduce the price for all customers.
- Consequently the marginal revenue declines more rapidly than the demand curve.
## Marginal Revenue of a Monopolist

Table 10.1  **The monopolist’s declining marginal revenue**

<table>
<thead>
<tr>
<th>(1) Quantity of yo-yos sold</th>
<th>(2) Price of yo-yos ($)</th>
<th>(3) Total revenue $(1 \times [2])$ ($)</th>
<th>(4) Marginal revenue (change in [3]) ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>11</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>9</td>
<td>18</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>8</td>
<td>24</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>7</td>
<td>28</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
<td>30</td>
<td>2</td>
</tr>
</tbody>
</table>
The Marginal Revenue Curve

- The demand function can be expressed as $P = D(Q)$.
- Revenue is $R = PQ = D(Q)Q$.
- Marginal revenue is

$$MR = \frac{dR}{dQ} = \frac{d(PQ)}{dQ} = \frac{d(D(Q)Q)}{dQ} = D'(Q)Q + P.$$  

- If the demand curve is a straight line, $P = a - bQ$.
- Then marginal revenue is

$$MR = a - 2bQ.$$  

- Geometrically, The MR curve has the same intercept as the demand curve but twice the slope.
Demand and Marginal Revenue

![Graphs showing demand and marginal revenue for a monopoly, with price and quantity axes.]
Output and Pricing Decision

- With an upward sloping MC curve, the monopolist maximizes profit by producing at the output level $Q_2$, where MC intersects MR.
- The firm will charge a price that the consumers are willing to pay at $Q_2$.
- This means the price $P_1$ on the demand curve (point $a$).
- You should convince yourself that it does not make sense for the monopolist to produce at any other output level such as $Q_1$ or $Q_3$.
- At the price-quantity combination $(P_1, Q_2)$, the monopolies is making economic profit.
- But barriers to entry keeps the firm safe from competition.
Recall that in a perfectly competitive market, the firms produce at the level that the market supply curve intersects the market demand curve.

The supply curve is the sum of all the firms’ MC curves.

For a monopolist, it is where the MC curve meets the demand curve (point $b$).

At point $b$, with output level $Q_c$, social marginal benefit is equal to social marginal cost, and is by definition economic efficient.

But the monopolist maximizes profit by choosing the combination $(P_m, Q_m)$.

At $Q_m$, social welfare is not maximized. There is a “dead weight loss” equal to the area of triangle $abc$. 
Social Welfare Loss of Monopoly

Monopolistic firm

Competitive firm

Price

\( P_m \)

\( P_c \)

Quantity

\( Q_m \)

\( Q_c \)

\( MC(S) \)

\( MR \)
The output difference between the efficient competitive market and a monopoly is $Q_c - Q_m$.

The consumers are willing to pay up to $Q_m ab Q_c$ for the increase in consumption.

The monopolist will get additional revenue equal to $Q_m cd Q_c$.

But the cost of the extra output is $Q_m cb Q_c$.

The extra cost incurred by expanding production from $Q_m$ to $Q_c$ exceeds the additional revenue acquired by the shaded area $cbd$.

The net gain to society is the area $abc$. 
Cost-Benefit Analysis of Expanded Production

(a) Consumers

(b) Monopolistic firm

Monopolistic Behaviours
Profits

- In a competitive market the firms can make short-run economic profits. But in the long run new entries will lower the market price and make profit zero.
- Barriers to entry makes long-run profits possible for a monopolist.
- A simple analysis of profit by assuming that technology exhibits constant returns to scale. Then $MC = AC$ and are constant.
- The monopolist maximizes profit by the price-output combination $(P_m, Q_m)$.
- Total revenue is the area $0P_m aQ_m$, while total cost is $0P_c cQ_m$.
- Monopolist profit is the shaded area $P_c P_m a c$. 
Monopolistic Profits
What a Monopolist Cannot Control

- Substitute goods — Mobile phone services instead of the local ground line; sparkling wine instead of champagne; courier services instead of postal services.
- Competitors reverse engineer trade secret and get around the intellectual property rights problems — Apple computer products, software development.
- Deregulation by government — Open sky policy for Canada and the U.S.; NAFTA and other free trade agreements, CRTC’s decision to let cable and phone companies to enter each other’s business.
- Antitrust suits against monopoly can be costly. Cases that involve IBM and Microsoft take years to resolve.
Economist Ronald Coase argues that monopolists of durable goods have no market power.

For example, a land owner can restrict land sales in the short run by raising prices.

But eventually the land owner wants to sell all her land. Rational buyers can wait to buy until the price come down on the demand curve.

The same idea applies to other products such as computer software and textbooks.
Getting Consumer Surplus

- So far we have assumed that a monopolist can charge the same price to all consumers.
- Consumer surplus exists even the monopolist maximizes profit by choosing \((P_m, Q_m)\).
- Price discrimination is a pricing structure designed by the monopolist that tries to capture as much consumer surplus as possible.
- The common practices are two-part tariff, nonlinear pricing, and market segmentation.
- An extreme case that the monopolist extracts all consumer surplus is called perfect price discrimination.
Perfect Price Discrimination

- This is an extreme theoretical case. The monopolist can sell each unit of its products at a different price.
- For each additional unit sold, it charges a price exactly on the demand curve, which is the consumers’ maximum willingness-to-pay at that particular quantity.
- Consequently, the marginal revenue is equal to the demand curve.
- The firm maximizes profit by setting $MC = MR = D$.
- The monopolist extracts the entire consumer surplus.
Getting All the Consumer Surplus

Note: The MR curve in Figure 10.7 of the textbook is incorrect.
And the Maximum Profits Possible

FIGURE 12-16

The Perfectly Discriminating Monopolist
The marginal revenue curve for the monopolist who can discriminate perfectly is exactly the same as his demand curve. The profit-maximizing output is $Q^*$, the one for which the SMC and demand curves intersect. Economic profit (II) is given by the shaded area.
Two-Part Tariff

- The price paid by the consumers involves two parts.
- The first part is a fixed fee for the right to buy the product. This comes in various forms such as membership fee, installation charge, connection charge, etc.
- The second part is the unit price of the product.
- The maximum fixed fee a seller can charge is the consumer surplus of a customer.
- Notice that the higher the market price the lower the consumer surplus.
- The extraction of consumer surpluses is imperfect since different consumers have difference demand curves.
Nonlinear Pricing

- In this case the firm offers different prices to all customers at different quantities bought by each customer.
- For example, each can of soup costs $1.50. But the customers can buy a box of 12 cans at $12.
- The opposite can happen if the item is on sale. A customer can buy up to five cans of soup at $1.20 each. Any quantity over the limit of five will be $2.00 each.
- Many products come with different package sizes, each has its own unit price. Normally the unit price decreases with size (family packs).
- The practice is normally used to charge a higher price to small quantity buyers.
Market Segmentation

- Due to imperfect information, a firm cannot possibly identify the demand curve of each individual customer and implements perfect price discrimination.
- In practice the firm tries to separate different groups of customers according to age, gender, location, time, price sensitivity, employment status (student price), etc.
- The demand and marginal revenue curves of each market segment is identified.
- The firm sets MC equals to the combined MR.
- Price-quantity combination in each market segment is selected by setting the particular MR to the combined MR.
Imperfect Price Discrimination by Market Segments

(a) Market A

(b) Market B

(c) Monopolist

Price

Price

Price

Quantity

Quantity

Quantity

$P_a$

$P_b$

$Q_a$

$Q_b$

$Q_m = Q_a + Q_b$

$MR_a$

$MR_b$

$MC$

$MR_m = MR_a + MR_b$
Price Control Under Monopoly

- If left unregulated, a monopolist chooses a price-quantity combination \((P_m, Q_m)\) such that \(MC = MR\).
- Government can intervene and set a price ceiling at a lower level, say, \(P_1\).
- With the price control, the monopolist faces a horizontal \(MR\) curve at \(P_1\) until it reaches the original market demand curve.
- The firm will choose the combination \((P_1, Q_1)\).
- Ideally the government can set the price at the level where \(MC\) meets the demand curve.
Price Control

![Graph showing price control in a monopoly market](image-url)
Taxing Monopoly Profits

- Part of the monopolist’s profits is extracted from the consumer surplus in a competitive market.
- The government can in principle impose a tax on a monopolist to recover the surplus.
- The tax should be a lump-sum tax which is independent of the output level. This leaves the MC curve unchanged after the tax.
- In practice, however, the tax is based on accounting profit, not economic profit. Then the tax may have an impact on the operation costs of the firm, shifting the MC curve up. This will result in an even higher monopoly price.
- Instead of imposing a tax, governments sometimes sell the monopoly rights by public auction. For example, in 2000 the British government received $34 billion from the bidding of 3G licences of mobile phone services.
Price Control

\[ p_{m2} \]

\[ p_{m1} \]

\[ p_c \]

\[ MR \]

\[ Q_{m1} \]

\[ Q_{m2} \]

\[ MC_2 = AC_2 \]

\[ MC_1 = AC_1 \]
Monopoly Involving Negative Externality

- In sectors that involve negative externalities such as pollution, illegal activities, sex trade, alcoholic abuses, gambling, etc., a monopoly that restrict production may be socially desirable.
- In Ontario, for example, LCBO exists to control alcohol consumption.
- Lotto 6/49 and Super 7 are the exclusive products from the Canadian Lottery Corporation.
- There are, however, unintended consequences. High illegal drug price may result in a higher petty crime rate.
Other Social Costs

- Government administration costs of monitoring monopolies.
- Wealth redistribution effects — Monopoly profits transfer income from low-income households to high-income entrepreneurs.
- The under-production of a key input factor such as electricity can affect the production decisions of many other sectors of the economy, causing further inefficiency.
- The economic profits earned by a monopolist result in less cost-saving incentives in production (higher agency cost, etc.)
- Rent seeking — Monopolists have the incentive to spend real resources on influencing government policies. This includes lobbying activities, political campaign contributions, bribery, etc. A monopolist can spend up to the amount of monopoly profit on these activities.
Profits from Creative Pricing

To implement price discrimination, the key point is to be able to identify and differentiate the type of customers a firm serves.

- **Degree of urgency** — airline tickets and tour packages are cheaper depending on the booking time before the travelling.
- **Degree of patience** — Hardcover books are more expensive for readers who want to get the latest novels as soon as possible. Other readers can wait for the paperback version. Same applies to movie theatre, DVD, Netflix, and the movie channels on TV.
- **Fads and fashion** — The “latest arrivals” are expansive. Generally stores discount new items after three months, followed by another discount after six months. Popular sizes will be sold out first, with odd sizes on clearance sales later.
More Creative Pricing

- Boxing day sales — demands are more elastic after Christmas than before Christmas.
- Coupons — a way to segment price sensitive customers from the less sensitive one.
- Pricing complements — why are the popcorons and drinks more expansive than the movie tickets? Movie junkies tend to enjoy snacking more than the casual viewers.
- Price discrimination by quality — Manufactures sometimes sell a product of less functionality at a higher cost of production. Examples: computer chips that run slower, disabling features in a software, printers that print at a lower speed.
- Unadvertised prices — giving customers a discount only when they ask for it.
More Creative Pricing

- Meet the competition — a seller pledge to meet or beat the lowest price in town. This reduces the incentive for the competitors to lower their prices, resulting in an overall high average price.

- Most favoured customer — low price and rewards to loyal customers. This always reduce the incentive for price competition and results in high average price. Examples: different colour schemes for credit cards.

- Frequent flyer programs — Practised by many airline companies, basically divide up the market with their loyal customers, resulting in more market power.