Chapter 10

Market Power: Monopoly and Monopsony
Topics to be Discussed

- Monopoly and Monopoly Power
- Sources of Monopoly Power
- The Social Costs of Monopoly Power
- Limiting Market Power: The Antitrust Laws
Review of Perfect Competition

- $P = LMC = LRAC$
- Zero economic profits (Normal profits) in the long run
- Large number of buyers and sellers
- Homogenous product
- Perfect information
- Firm is a price taker
Review of Perfect Competition

Market

Individual Firm

D = MR = P

Chapter 10
Monopoly

1. One seller - many buyers
2. One product (no good substitutes)
3. Barriers to entry
4. Price Maker
Monopoly

- The monopolist is the supply-side of the market and has complete control over the amount offered for sale.
- Monopolist controls price but must consider consumer demand.
- Profits will be maximized at the level of output where marginal revenue equals marginal cost.
Average and Marginal Revenue

- The monopolist’s **average revenue**, price received per unit sold, is the market demand curve.
- Monopolist also needs to find **marginal revenue**, change in revenue resulting from a unit change in output.
Average and Marginal Revenue

Finding Marginal Revenue
- As the sole producer, the monopolist works with the market demand to determine output and price
- An example can be used to show the relationship between average and marginal revenue
- Assume a monopolist with demand:
  \[ P = 6 - Q \]
## Total, Marginal, and Average Revenue

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<tr>
<th>Price (P)</th>
<th>Quantity (Q)</th>
<th>Total Revenue (R)</th>
<th>Marginal Revenue (MR)</th>
<th>Average Revenue (AR)</th>
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Average and Marginal Revenue

Average Revenue (Demand)

Marginal Revenue

$ per unit of output

Chapter 10
Monopolist’s Output Decision

- Profits maximized at the output level where $MR = MC$
- At output levels below $MR = MC$, the decrease in revenue is greater than the decrease in cost ($MR > MC$)
- At output levels above $MR = MC$, the increase in cost is greater than the decrease in revenue ($MR < MC$)
Monopolist’s Output Decision

$\text{per unit of output}$

$P_1$  

$P^*$  

$P_2$  

Lost profit

$Q_1$  

$Q^*$  

$Q_2$  

$MC$  

$AC$  

$D = AR$  

Lost profit
Monopoly: An Example

\[
\text{Cost} = C(Q) = 50 + Q^2
\]

\[
MC = \frac{\Delta C}{\Delta Q} = 2Q
\]

\[
\text{Demand} : P(Q) = 40 - Q
\]

\[
R(Q) = P(Q)Q = 40Q - Q^2
\]

\[
MR = \frac{\Delta R}{\Delta Q} = 40 - 2Q
\]
Monopoly: An Example

\[ MC = MR \]
\[ 2Q = 40 - 2Q \]
\[ 4Q = 40 \]
\[ Q = 10 \]

\[ P(Q) = 40 - Q \]
\[ P(Q) = 40 - 10 \]
\[ P(Q) = 30 \]
Monopoly: An Example

- By setting marginal revenue equal to marginal cost, we verified that profit is maximized at $P = 30$ and $Q = 10$
- This can be seen graphically by plotting cost, revenue and profit
  - Profit is initially negative when produce little or no output
  - Profit increase and $q$ increase, maximized at $Q^* = 10$
Example of Profit Maximization

Profit = (P - AC) x Q
= ($30 - $15)(10) = $150
A Rule of Thumb for Pricing

\[ MR = P + P \left( \frac{1}{E_d} \right) \]

\[ \frac{P - MR}{P} = - \frac{1}{E_D} \]

\[ P = \frac{MR}{1 + \left( \frac{1}{E_D} \right)} = \frac{MC}{1 + \left( \frac{1}{E_D} \right)} \]

\[ E . g . \) Assume \]

\[ E_d = -4 \quad MC = 9 \]

\[ P = \frac{9}{1 + \left( \frac{1}{-4} \right)} = \frac{9}{.75} = 12 \]
A Rule of Thumb for Pricing

- \( \frac{P - MC}{P} \) is the markup over MC as a percentage of price
- The markup should equal the inverse of the elasticity of demand
- Price is expressed directly as the markup over marginal cost
Monopoly

Monopoly pricing compared to perfect competition pricing:

- Monopoly
  - \( P > MC \)
  - Price is larger than MC by an amount that depends inversely on the elasticity of demand

- Perfect Competition
  - \( P = MC \)
  - Demand is perfectly elastic, so \( P=MC \)
Monopoly

- If demand is very elastic, there is little benefit to being a monopolist
- The larger the elasticity, the closer to a perfectly competitive market
- Notice a monopolist will never produce a quantity in the inelastic portion of demand curve
  - In inelastic portion, can increase revenue by decreasing quantity and increasing price
Supply Curve of Monopoly

- In perfect competition, the market supply curve is determined by marginal cost.
- For a monopoly, output is determined by marginal cost and the shape of the demand curve.
  - There is no supply curve for monopolistic market.
The Effect of a Tax

- In competitive market, a per-unit tax causes price to rise by less than tax: burden is shared by producers and consumers.
- Under monopoly, price can sometimes rise by more than the amount of the tax.
- To determine the impact of a tax:
  - $t = \text{specific tax}$
  - $MC = MC + t$
Effect of Excise Tax on Monopolist

Increase in $P$: $P_0$ to $P_1 > \text{tax}$
The Multi-plant Firm

- For some firms, production takes place in more than one plant, each with different costs.
- Firm must determine how to distribute production between both plants.
  1. Production should be split so that the MC in the plants is the same.
  2. Output is chosen where MR=MC. Profit is therefore maximized when MR=MC at each plant.
The Multi-plant Firm

- We can show the same for Plant 2
- Therefore, we can see that the firm should choose to produce where
  \[ MR = MC_1 = MC_2 \]
- We can show this graphically
  - MR = MC_T gives total output
  - This point shows the MR for each firm
  - Where MR crosses MC_1 and MC_2 shows the output for each firm
Production with Two Plants

\( D = AR \)

\( MC_1 \)

\( MC_2 \)

\( MC_T \)

\( P^* \)

\( MR^* \)

\( Q_1 \)

\( Q_2 \)

\( Q_T \)

\( MR \)

\( D = AR \)
Monopoly Power

- Pure monopoly is rare

- However, a market with several firms, each facing a downward sloping demand curve, will produce so that price exceeds marginal cost

- Firms often produce similar goods that have some differences, thereby differentiating themselves from other firms
Measuring Monopoly Power

- Could measure monopoly power by the extent to which price is greater than MC for each firm.

- Lerner’s Index of Monopoly Power

- \[ L = \frac{(P - MC)}{P} = \frac{-1}{E_d} \]

  The larger the value of \( L \) (between 0 and 1) the greater the monopoly power.
Elasticity of Demand and Price Markup

The more elastic is demand, the less the markup.
Monopoly Power and Profit

- Monopoly power, however, does not guarantee profits.
- Profit depends on average cost relative to price.
- One firm may have more monopoly power but lower profits due to high average costs.
Chapter 10

Markup Pricing: Supermarkets & Convenience Stores

Supermarkets
1. $E_d = -10$ for individual stores
2. $P = \frac{MC}{1 + (1/E_d)} = \frac{MC}{0.9} = 1.11(MC)$
3. Prices set about 10-11% above MC.

Convenience Stores
1. $E_d = -5$
2. $P = \frac{MC}{1 + (1/E_d)} = \frac{MC}{0.8} = 1.25(MC)$
3. Prices set about 25% above MC
Sources of Monopoly Power

- The less elastic the demand curve, the more monopoly power a firm has.
- The firm’s elasticity of demand is determined by:
  1) Elasticity of market demand
  2) Number of firms in market
  3) The interaction among firms
Elasticity of Market Demand

- With one firm, their demand curve is market demand curve
  - Degree of monopoly power is determined completely by elasticity of market demand
- With more firms, individual demand may differ from market demand
  - Demand for a firm’s product is more elastic than the market elasticity
Number of Firms

- The monopoly power of a firm falls as the number of firms increases; all else equal
  - More important are the number of firms with significant market share
  - Market is **highly concentrated** if only a few firms account for most of the sales
- Firms would like to create **barriers to entry** to keep new firms out of market
  - Patent, copyrights, licenses, economies of scale
Interaction Among Firms

- If firms are aggressive in gaining market share by, for example, undercutting the other firms, prices may reach close to competitive levels.
- If firms collude (violation of antitrust rules), could generate substantial monopoly power.
- Markets are dynamic and therefore, so is the concept of monopoly power.
The Social Costs of Monopoly Power

- Monopoly power results in higher prices and lower quantities.
- However, does monopoly power make consumers and producers in the aggregate better or worse off?
- We can compare producer and consumer surplus when in a competitive market and in a monopolistic market.
Because of the higher price, consumers lose $A+B$ and producer gains $A-C$. 

Deadweight Loss from Monopoly Power
The Social Costs of Monopoly

- Social cost of monopoly is likely to exceed the deadweight loss
- Rent Seeking
  - Firms may spend to gain monopoly power
    - Lobbying
    - Advertising
    - Building excess capacity
The Social Costs of Monopoly

Example

- In 1996, Archer Daniels Midland (ADM) successfully lobbied for regulations requiring ethanol to be produced from corn.
- Although ethanol is the same whether produced from corn, potatoes, grain or anything else, ADM had a near monopoly on corn-based ethanol production.
The Social Costs of Monopoly

- Government can regulate monopoly power through **price regulation**
  - Recall that in competitive markets, price regulation creates a deadweight loss
  - Price regulation can eliminate deadweight loss with a monopoly
  - The effect of the regulation can be shown graphically
If price is lowered to $P_c$, output increases to its maximum $Q_c$ and there is no deadweight loss.

If price is lowered to $P_3$, output decreases and a shortage exists.
The Social Costs of Monopoly Power

- Natural Monopoly
  - A firm that can produce the entire output of an industry at a cost lower than what it would be if there were several firms.
  - Usually arises when there are large economies of scale.
  - We can show that splitting the market into two firms results in higher AC for each firm than when only one firm was producing.
Regulating the Price of a Natural Monopoly

If the price were regulate to be $P_c$, the firm would lose money and go out of business. Can’t cover average costs.

Setting the price at $P_r$ giving profits as large as possible without going out of business.
The Social Costs of Monopoly Power

- Regulation in Practice
  - It is very difficult to estimate the firm's cost and demand functions because they change with evolving market conditions.
  - An alternative pricing technique – rate-of-return regulation allows the firms to set a maximum price based on the expected rate or return that the firm will earn. But, Firm’s capital stock is difficult to value.
Cf) Monopsony

- A monopsony is a market in which there is a single buyer.
- An oligopsony is a market with only a few buyers.
- Monopsony power is the ability of the buyer to affect the price of the good and pay less than the price that would exist in a competitive market.
Cf) Monopsony

- Typically choose to buy until the benefit from last unit equals that unit’s cost
- **Marginal value** is the additional benefit derived from purchasing one more unit of a good
  - Demand curve – downward sloping
- **Marginal expenditure** is the additional cost of buying one more unit of a good
  - Depends on buying power
Limiting Market Power: The Antitrust Laws

What can we do to limit market power and keep it from being used anti-competitively?

- Tax away monopoly profits and redistribute to consumers
  - Difficult to measure and find all those who lost
- Direct price regulation of natural monopolies
- Keep firms from acquiring excessive market power
  - Antitrust laws
The Antitrust Laws

- Rules and regulations designed to promote a competitive economy by:
  - Prohibiting actions that restrain or are likely to restrain competition
  - Restricting the forms of allowable market structures
- Monopoly power arises in a number of ways, each of which is covered by the antitrust laws
Limiting Market Power: The Antitrust Laws

- Sherman Act (1890)
  1. Prohibits contracts, combinations, or conspiracies in restraint of trade
     - Explicit agreement to restrict output or fix prices
     - Implicit collusion through parallel conduct
       - Form of implicit collusion in which one firm consistently follows actions of another
  2. Makes it illegal to monopolize or attempt to monopolize a market and prohibits conspiracies that result in monopolization
Limiting Market Power: The Antitrust Laws

• Clayton Act (1914)
  1. Makes it unlawful to require a buyer not to buy from a competitor
  2. Prohibits predatory pricing
     • The practice of pricing to drive current competitors out of business and to discourage new entrants in a market so that a firm can enjoy higher future profits
  3. Prohibits mergers and acquisitions if they “substantially lessen competition” or “tend to create a monopoly”
Limiting Market Power: The Antitrust Laws

- Robinson-Patman Act (1936)
  - Amendment to the Clayton Act
  - Prohibits price discrimination if it causes buyers to suffer economic damages and competition is reduced
Limiting Market Power: The Antitrust Laws

  1. Created the Federal Trade Commission (FTC)
  2. Supplements the Sherman and Clayton Acts by fostering competition through a set of prohibitions against unfair and anticompetitive practices
  - Prohibitions against deceptive advertising, labeling, agreements with retailer to exclude competing brands
Enforcement of Antitrust Laws

- US antitrust laws are stricter and more far-reaching than the rest of the world
  - Some have claimed this has hindered US competing in international markets
- With growth of European Union, methods of antitrust enforcement have evolved
  - Similar to US laws with some procedural and substantive differences
  - Europe only imposes civil penalties
Limiting Market Power: The Antitrust Laws

- Two Examples
  - American Airlines
    - Early 80’s president and CEO accused of attempting to price fix
  - Microsoft
    - Monopoly power
    - Predatory actions
    - Collusion