Lecture 12:
Imperfect Competition

Readings: Chapters 14,15

Q: How relevant are the Perfect Competition and Monopoly models to the real world?
A: Very few real world business is carried out in industries which are perfectly competitive or monopolistic. The two most common forms of industrial structure (market structure) are:
- Monopolistic competition
- Oligopoly

Q: What is Monopolistic competition?
A: It is a market structure where:
- many firms compete through product differentiation — making similar but slightly different products
- firms have some monopoly (price setting) power because their good does not have a perfect substitute supplied by anyone.
- entry and exit to the industry is fairly easy.

Implications?
- A monopolistic competitor faces a downward-sloping demand curve in which MR < P
- To maximize profits, set Q where MC = MR.
- Profits attract entry by competitors supplying substitutes → leftward shift demand curve facing each firm
- Losses cause exit → rightward shift demand curve facing each firm

The firm in monopolistic competition operates like a single-price monopoly.
- The firm produces the quantity at which MR equals MC and sells that quantity for the highest possible price.
- It earns an economic profit (as in this example) when P > ATC.

Price and Output in Monopolistic Competition
But a firm might also incur an economic loss in the short run. Here is an example. At the profit-maximizing quantity, \( P < ATC \) and the firm incurs an economic loss.

Price and Output in Monopolistic Competition

- Long Run: Zero Economic Profit
  - In the long run, economic profit induces entry.
  - And entry continues as long as firms in the industry earn an economic profit—as long as \( P > ATC \).
  - In the long run, a firm in monopolistic competition maximizes its profit by producing the quantity at which its marginal revenue equals its marginal cost, \( MR = MC \).

As firms enter the industry, each existing firm loses some of its market share. The demand for its product decreases and the demand curve for its product shifts leftward. The decrease in demand decreases the quantity at which \( MR = MC \) and lowers the maximum price that the firm can charge to sell this quantity. Price and quantity fall with firm entry until \( P = ATC \) and firms earn zero economic profit.
Figure 14.3 shows a firm in monopolistic competition in long-run equilibrium.

There are two key differences between monopolistic competition and perfect competition are:

- Excess capacity
- Markup

A firm has excess capacity if it produces less than the quantity at which ATC is a minimum.

A firm’s markup is the amount by which its price exceeds its marginal cost.

Firms in monopolistic competition operate with excess capacity in long-run equilibrium.

Firms produce less than the efficient scale—the quantity at which ATC is a minimum.

The downward-sloping demand curve for their products drives this result.

Firms in monopolistic competition operate with positive markup.

Again, the downward-sloping demand curve for their products drives this result.
In contrast, firms in perfect competition have no excess capacity and no markup. The perfectly elastic demand curve for their products drives this result.

Q: How would consumers evaluate monopolistic competition and perfect competition?
A1: The higher ATC and price of monopolistic competition means less consumer surplus than under perfect competition.
A2: On the other hand, monopolistic competition benefits consumers by increasing: product variety; product innovation; and consumer information.

Q: Is it possible for an industry to have positive profits in the long-run if it is not a monopoly?
A: Firms in an Oligopoly market structure may realize long-run profits.

Q: What is an oligopoly?
A: It is an industry in which:
- Only few (large) firms supply the market
- These firms have price setting power
- Entry is difficult (barriers to entry)

Q: How does the behaviour of firms in an oligopoly differ from firms in other market structures?
A: Because of the small number of firms, any action by a competitor will alter a firm's demand and profit. Firms must anticipate the actions of its competitors, and include competitor actions in their strategies.
Because the firms competitors will do the same, the firm must consider the effects of its actions on the behaviour of others. Such interdependence creates a complicated strategic environment.

Q: In the absence of strategic interactions, what is the profit maximizing strategy of an oligopoly firm?
Choose Q where MR=MC and charge the highest price possible to sell precisely this many units.

Q: How can strategic interactions be introduced into the model of a profit maximizing firm?
A: There are many models. The earliest and simplest is Stigler’s Kinked Demand curve model.
Q: How are strategic interactions introduced in the kinked demand curve model?

A: Stigler assumed that firms react to their competitors by adopting a simple rule:
   • match price reductions.
   • ignore price increases.

If all firms follow this rule, then each firm expects to face a kinked demand curve, with kink at the current equilibrium $P, Q$.

Two Traditional Oligopoly Models

- The kink in the demand curve means that the $MR$ curve is discontinuous at the current quantity—shown by that gap $AB$ in the figure.

- Above the kink, demand is relatively elastic because all other firm’s prices remain unchanged.

- Below the kink, demand is relatively inelastic because all other firm’s prices change in line with the price of the firm shown in the figure.

This slide helps to envisage why the kink in the demand curve puts a break in the marginal revenue curve.
Fluctuations in MC that remain within the discontinuous portion of the MR curve leave the profit-maximizing quantity and price unchanged.

For example, if costs increased so that the MC curve shifted upward from $MC_0$ to $MC_1$, the profit-maximizing price and quantity would not change.

The Theory of Supply - Imperfect Competition

- Q: What does the kinked demand curve predict about behaviour in oligopolies?
  
  - A: sticky prices
    
    - Small changes in MC will not alter Q or P.
    
    - Monopolies exhibited price stickiness to changes in FC but not changes in MC.

- Q: How might we model choice of reaction strategies?
  
  - A: Game theory attempts to model reaction strategy choices in an environment of strategic interaction. As with other models of firm decision making, the objective guiding the choice is profit maximization.
  
  - Good models will generate strategy equilibrium which help us understand the observed strategy choices which firms adopt in the real world.

- Q: How is game theory used to analyze the strategic behaviour of firms in oligopolies?
  
  - A: A game is defined by specifying:
    
    - A set of players.
    
    - A set of strategies available to the players delineating permissible actions by players (such as raising or lowering price, output, advertising, or product quality.)
    
    - A set of payoffs for each player under each possible combination of strategies taken by all the players.
Q: Can a simple model of a ‘game’ provide any deep insight into anything as complex as the strategic between the world’s most powerful companies?

A: The “Prisoners’ dilemma” is one-time, two-person game that provides surprising answers to a huge number of situations in which there are strategic interactions.

The game is defined as:
- **Players**: Art and Bob
- **Strategies**: Each player is accused of a crime. Each player may choose to either confess or deny.
- **Payoffs**: The expected payoff for each player under all possible strategy combinations can be summarized in a **payoff matrix**.

Each player’s dominant strategy is to confess.

- It is a dominant strategy for Art to confess, because confessing is Art’s best response to both of Bob’s strategies. Similarly it is a dominant strategy for Bob to confess.
- John Nash also suggested that Bob Confess – Art Confess is an equilibrium strategy combination in the sense that neither players has an incentive to deviate from their strategy given the other player’s action.
The Theory of Supply - Imperfect Competition

- **Q:** What does this model tell us about strategic interaction?
- **A:** It explains police behaviour in questioning suspects:
  - Keep suspects apart
  - Suggest the other suspect is ratting him out
  - Offer both suspects a plea bargain

- **Q:** Does the model help us understand the behaviour of large firms in an oligopoly industry?
- **A:** The model explains why collusive price fixing agreements often fall apart.
  - Consider a Duopoly (oligopoly with two firms).
  - Each firm (Gear & Trick) can compete or collude.
  - Competition will reduce prices and profits.
  - Collusion will allow them to behave like a monopolist and raise prices and profits.
Part (a) shows each firm's cost curves.
Part (b) shows the market demand curve.

This industry is a natural duopoly.
Two firms can meet the market demand at the least cost.

Q: How does this market work?
A: If they compete: \( P = 6 \) and \( Q = 6 \) in equilibrium.

Q: Can they do better?
A: Yes if the two firms enter into a collusive agreement in which they plan to restrict output, raise the price, and increase profits.
Such agreements are illegal in the Canada and the United States and are undertaken in secret.
Firms in a collusive agreement operate a cartel.
To find that profit, we set marginal cost for the cartel equal to marginal revenue for the cartel.

The cartel’s marginal cost curve is the horizontal sum of the MC curves of the two firms and the marginal revenue curve is like that of a monopoly.

Each firm agrees to produce 2,000 units and each firm shares the maximum economic profit.

When each firm produces 2,000 units, the price is greater than the firm’s marginal cost, so if one firm increased output, its profit would increase.
Suppose one firm cheats on a collusive agreement. The cheat increases its output to 3,000 units. Industry output increases to 5,000 and the price falls.

For the complier, \( ATC \) now exceeds price. For the cheat, price exceeds \( ATC \).

The complier incurs an economic loss. The cheat makes an increased economic profit.

Suppose that both firms cheat and increase their output to 3,000 units.
Industry output is 6,000 units, the price falls, and both firms make zero economic profit—the same as in perfect competition.

The strategies that firms in a cartel can pursue are to:
- Comply
- Cheat

Because each firm has two strategies, there are four possible combinations of actions for the firms:
- 1. Both comply.
- 2. Both cheat.
- 3. Trick complies and Gear cheats.
- 4. Gear complies and Trick cheats.

Possible Outcomes
- If both comply, each firm makes $2 million a week.
- If both cheat, each firm makes zero economic profit.
- If Trick complies and Gear cheats, Trick incurs an economic loss of $1 million and Gear makes an economic profit of $4.5 million.
- If Gear complies and Trick cheats, Gear incurs an economic loss of $1 million and Trick makes an economic profit of $4.5 million.
The Nash equilibrium in Duopolists' Dilemma

- The Nash equilibrium is that both firms cheat.
- The quantity and price are those of a competitive market, and the firms make zero economic profit.

Q: Is this a realistic model?
A: There are numerous examples:
- Joe Smith’s secret contract with the Minnesota Timberwolves

Q: If it is so difficult how can firms collude?
A: They attempt to bind themselves to contracts.

Q: Are collusive contracts possible?
A: Generally no! It is illegal to enter into collusive arrangements.

Q: Are there exceptions?
A: There are two exceptions:
- Professional sports leagues are exempt, and may pursue collusive arrangements.
- It is not against international law enter into a collusive agreement.
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Q: Should we be worried?
A: Perhaps. Secret agreements may be supported as an equilibrium in repeated games. The incentive to cheat is reduced when players adopt dynamic strategies such as:

- **tit-for-tat** — take the same action as the other player took in the last period
- **trigger** — cooperate until the other player cheats, then respond by cheating forever

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Q: How much power do firms in oligopolies have?
A: It depends on the cost of entry to the industry:

- If a firm is in a Contestable market, then entry and exit are relatively cheap.
- Incumbent firms must not raise price much above the competitive market price, or else a new firm may enter the industry, increase output and reduce prices.
- The threat of entry keeps prices closer to the competitive market price than the monopoly price.

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Game theory can be used to analyze other choices facing firms:

- how much to spend on research and development
- how much to spend on advertising
- whether to enter or exit an industry

Figure 15.8 shows the game tree for a sequential entry game in a contestable market.

In the first stage, Agile decides whether to set the monopoly price or the competitive price.
In the second stage, Wanabe decides whether to enter or stay out.

In the equilibrium of this entry game,

- Agile sets a competitive price and makes zero economic profit to keep Wanabe out.
- A less costly strategy is limit pricing, which sets the price at the highest level that is consistent with keeping the potential entrant out.

Q: Can firms in an oligopoly protect aggressively deter entry even if the costs of entry are low?

A: There are a number of entry deterring strategies. The most famous is Predatory pricing (i.e. Air Canada).

Q: When will oligopoly behave like a monopoly?

A: When entry costs are high, or when entry deterring strategies are effective.

To protect against collusion most countries have enacted anti-combine or anti-trust legislation

- 1889 - Canada’s first anti-combine law
- The 1986 Act established a Competition Bureau and a Competition Tribunal.
- The Act distinguishes between criminal and noncriminal practices.

Criminal practices include
- Conspiracy to fix prices
- Bid-rigging
- False advertising

Non-Criminal practices include
- Mergers
- Abuse of dominant position
- Exclusive dealing

Some Major Anti-Combine Cases
- **NutraSweet** tried to gain a monopoly in aspartame (non-sugar sweetener) by licensing the use of its “swirl” only on products for which it had an exclusive deal.
- **Bell Canada Enterprises** tried to tie the sale of advertising space in the Yellow Pages to the sale of advertising services from one of its own subsidiaries.
Other Recent Cases

- Cineplex Galaxy Famous Players merge allowed.
- Bank merger between Royal Bank and Bank of Montreal and merger between CIBC and TD Bank were blocked.
- Gasoline price-fixing cartel in Quebec investigated and fined more than $2 million.
- NHL cleared of anticompetitive policies.