UNIT 4

Imperfect Competition

Monopoly, price discrimination, monopolistic competition, oligopoly, and game theory

15–22%	8–10	5
EXAM WEIGHTING	CLASS PERIODS	TOPICS IN UNIT

Teacher presentation · Aligned to the College Board Course and Exam Description

What This Unit Covers

TOPICS IN THIS UNIT

- 4.1 Introduction to Imperfectly Competitive Markets
- 4.2 Monopoly
- 4.3 Price Discrimination
- 4.4 Monopolistic Competition
- 4.5 Oligopoly and Game Theory

BIG IDEAS

- PRD — Production Choices and Behavior: What drives producers' decision making?
- How are imperfectly competitive markets inefficient?

WHY IT MATTERS

In the real world, firms rarely operate in perfectly competitive markets. This unit examines how imperfectly competitive markets depart from the perfect competition model — and the welfare losses that result when firms have market power.

15–22% of the AP Exam multiple-choice and free-response score

TOPIC 4.1

Introduction to Imperfectly Competitive Markets

Enduring Understanding PRD-3 — Market structure constrains and influences prices, output, and efficiency.

LEARNING OBJECTIVES: PRD-3.B — Characteristics of imperfectly competitive markets and their inefficiency.

Imperfect Competition and Barriers to Entry

Imperfectly competitive markets include monopoly, oligopoly, and monopolistic competition — plus monopsony in factor markets.

Firms Have Market Power

Unlike a price taker, an imperfect competitor must LOWER its price to sell additional units — so it has some control over price.

Price Exceeds Marginal Cost

In imperfectly competitive markets, price is greater than marginal cost. Consumers and producers respond to prices above the marginal cost of production — a sign of inefficiency.

Barriers to Entry

Barriers to entry sustain imperfect structures: high fixed or start-up costs, legal barriers (patents, licenses), and exclusive ownership of a key resource.

The Four Market Structures

A spectrum from many firms with no power to a single firm with the most power.

PERFECT COMPETITION

- **Many firms, identical products.**
- No barriers to entry.
- Price taker: P = MR.
- Efficient; zero long-run profit.

MONOPOLISTIC COMPETITION & OLIGOPOLY

- **Mon. competition: many firms, differentiated products.**
- Oligopoly: a few interdependent firms.
- Some/low barriers (mon. comp.); high barriers (oligopoly).
- Both inefficient: P > MC.

MONOPOLY

- **A single firm IS the industry.**
- Very high barriers to entry.
- The most market power; P far above MC.
- Inefficient; can earn long-run profit.

Why Marginal Revenue Lies Below Demand

The Price Taker (Review)

A perfectly competitive firm sells all it wants at the market price, so price = marginal revenue and demand is a horizontal line.

The Imperfect Competitor

An imperfect competitor faces the downward-sloping market (or firm) demand curve — to sell one more unit it must lower the price on ALL units.

So MR < Price

Because the lower price applies to every unit sold, the marginal revenue from the extra unit is LESS than its price. The MR curve lies below the demand curve.

TOPIC 4.2

Monopoly

A single firm protected by barriers to entry — the structure with the most market power.

LEARNING OBJECTIVES: PRD-3.B — Monopoly equilibrium, firm decisions, surplus, profit/loss, and deadweight loss.

Monopoly: Profit and Deadweight Loss

A monopoly picks the profit-maximizing quantity where MR = MC, then charges the price the demand curve allows.

- Find the quantity where MR = MC (Qm), then go UP to the demand curve to set the price (Pm).
- The monopoly price is greater than marginal cost — the hallmark of inefficiency.
- Profit per unit = Pm − ATC; total economic profit = (Pm − ATC) × Qm.
- Because output is restricted below the efficient level, a DEADWEIGHT LOSS results.

KEY TAKEAWAY

A monopoly produces where MR = MC but prices off the demand curve. P > MC, output is too low, and deadweight loss results.

Monopoly Power and Natural Monopoly

Monopoly Exists Because of Barriers

A monopoly persists only because barriers to entry block competitors — legal barriers, control of a key resource, or extremely high start-up costs.

Inefficiency of Monopoly

Because price exceeds marginal cost, a monopoly produces too little. Prices cannot coordinate the actions of all market participants, so the output is inefficient.

Natural Monopoly

A NATURAL monopoly exists when long-run economies of scale for a single firm continue throughout the entire effective demand for the product — one large firm produces at lower average cost than several small ones could.

Natural Monopoly

In a natural monopoly, average total cost keeps falling over the entire range of market demand.

- Long-run economies of scale extend across the whole market — ATC declines throughout.
- Because ATC is always falling, marginal cost lies BELOW average total cost.
- A single large firm can serve the market at a lower average cost than several small firms.
- Splitting the market among many firms would raise average cost — so one firm is 'natural.'

KEY TAKEAWAY

A natural monopoly has continuously falling ATC over the whole market, so MC lies below ATC and one firm is most cost-effective.

TOPIC 4.3

Price Discrimination

How a firm with market power can charge different prices to different buyers.

LEARNING OBJECTIVES: PRD-3.B — How a firm with market power engages in price discrimination.

Perfect Price Discrimination

A firm with market power can price discriminate to capture additional consumer surplus and increase profit.

- Price discrimination means charging different buyers different prices for the same good.
- Under PERFECT price discrimination, the firm charges each buyer the maximum they will pay.
- The firm then produces where price equals marginal cost — the SAME quantity as a competitive market.
- It extracts ALL economic surplus as profit and eliminates deadweight loss entirely.

KEY TAKEAWAY

A perfectly price-discriminating monopolist produces the efficient quantity (P = MC) but captures all surplus — no consumer surplus, no deadweight loss.

Conditions for Price Discrimination

1 Market Power

The firm must be a price setter, not a price taker. A perfectly competitive firm cannot price discriminate.

2 Ability to Segment Buyers

The firm must be able to identify groups with different willingness to pay — for example, by age (student discounts) or by timing (peak vs. off-peak).

3 Prevent Resale

The firm must prevent buyers who pay a low price from reselling to those charged a high price — otherwise the price difference collapses.

TOPIC 4.4

Monopolistic Competition

Many firms selling differentiated products — competitive entry but some market power.

LEARNING OBJECTIVES: PRD-3.B — Monopolistic competition in the short run and long run.

Monopolistic Competition: Short Run

In the short run, a monopolistically competitive firm behaves like a monopoly — it can earn profit or loss.

- The firm faces a downward-sloping demand curve, with MR below it.
- It produces where MR = MC and prices off the demand curve, so P > MC.
- In the short run it may earn positive, negative, or zero economic profit.
- Firms differentiate their products — often through advertising — to gain a bit of market power.

KEY TAKEAWAY

In the short run, a monopolistically competitive firm looks like a monopoly: MR = MC for quantity, price off demand, and possible profit or loss.

Monopolistic Competition: Long Run

Free entry and exit drive economic profit to zero in the long run.

- Short-run profit attracts entry; short-run loss causes exit — economic profit is driven to ZERO.
- In long-run equilibrium, the demand curve is tangent to the ATC curve at the firm's output.
- Output is SMALLER than the level that minimizes ATC — the firm has EXCESS CAPACITY.
- Price still exceeds marginal cost, so the outcome is allocatively INEFFICIENT.

KEY TAKEAWAY

Long-run monopolistic competition: zero economic profit (D tangent to ATC), but excess capacity and P > MC — allocatively inefficient.

Monopolistic Competition: Key Features

Many Firms, Differentiated Products

Many sellers compete, each offering a slightly different product. Differentiation gives each firm a downward-sloping demand curve and a little market power.

Advertising and Product Differentiation

Firms typically use advertising to differentiate their products and make their demand curves less elastic — to stand out from rivals.

Excess Capacity and Inefficiency

In the long run, firms earn zero economic profit but produce below minimum-ATC output (excess capacity), and price exceeds marginal cost.

TOPIC 4.5

Oligopoly and Game Theory

Enduring Understanding PRD-3 — A few interdependent firms behave strategically.

LEARNING OBJECTIVES: PRD-3.C — Key terms of oligopoly and game theory; strategies and equilibria in simple games.

Oligopoly: Few Firms, Interdependence

A Few Interdependent Firms

An oligopoly has only a few firms, protected by high barriers to entry. Each firm's best move depends on what the others do — they are INTERDEPENDENT.

Incentive to Collude

Oligopolists have an incentive to collude — to coordinate on higher prices and lower output — and may form a CARTEL to act like a single monopoly.

An Inefficient Structure

Oligopoly is inefficient: prices are generally higher and quantities lower than under perfect competition, though usually not as extreme as pure monopoly.

Game Theory: The Basics

A Game

A situation in which several players take actions, and each player's PAYOFF depends on both their own choice AND the choices of the other players.

A Strategy

A complete plan of action for playing a game. The normal-form model (a payoff matrix) shows the payoffs that result from each combination of strategies.

Dominant Strategy

A player has a DOMINANT strategy when one action yields a higher payoff no matter what the other player does. Not every game has a dominant strategy.

Reading a Payoff Matrix

Two firms each choose to ADVERTISE or NOT. Each cell shows (Firm A's profit, Firm B's profit), in millions.

Both Advertise

Firm A gets 8, Firm B gets 8. Costly advertising cancels out — both spend, neither gains an edge.

A Advertises, B Doesn't

Firm A gets 14, Firm B gets 4. The advertiser captures customers from the rival.

B Advertises, A Doesn't

Firm A gets 4, Firm B gets 14. Mirror image — the advertiser wins.

Neither Advertises

Firm A gets 10, Firm B gets 10. Both save the ad cost — jointly the best outcome.

Nash Equilibrium and the Prisoner's Dilemma

Nash Equilibrium

A set of actions in which no player can increase their payoff by unilaterally changing strategy, given what the other players are doing. In the ad example, 'both advertise' is the Nash equilibrium.

The Prisoner's Dilemma

Both firms advertising (8, 8) is worse for both than neither advertising (10, 10) — yet each firm's dominant strategy leads them there. Individually rational choices give a collectively worse result.

Why Oligopolies Struggle to Collude

Oligopolists face the same dilemma: each has an incentive to cheat on a collusive agreement, so the cooperative monopoly outcome is hard to sustain.

Common Pitfalls & Exam Tips

MR lies below D

For every imperfect product market, the marginal revenue curve is below the demand curve. Draw it correctly.

MR = MC sets quantity; D sets price

A monopoly finds quantity where MR = MC, then goes UP to the demand curve for the price. Never price off MR.

Patent vs. natural monopoly

A natural monopoly has continuously falling ATC over the whole market; a barrier-based monopoly need not.

Monopolistic competition long run

Zero economic profit (D tangent to ATC), but excess capacity and P > MC — still inefficient.

Dominant strategy test

An action is dominant if it is best against EVERY option of the rival. Check both of the opponent's choices.

Nash equilibrium

At a Nash equilibrium, no player can do better by changing strategy alone — it need not be the best joint outcome.

Unit 4 — Key Takeaways

1. Imperfect competitors have market power and must lower price to sell more, so MR lies below demand and P > MC.
2. A monopoly produces where MR = MC and prices off demand; P > MC creates deadweight loss; barriers sustain it.
3. Perfect price discrimination produces the efficient quantity (P = MC) but captures all surplus as profit.
4. Monopolistic competition: differentiated products, zero long-run profit, but excess capacity and P > MC.
5. Oligopoly: a few interdependent firms with an incentive to collude; outcomes are inefficient.
6. Game theory analyzes strategy: dominant strategies and Nash equilibria explain why collusion is hard to sustain.