LM01 · ECONOMICS · CFA LEVEL I

The Firm and Market Structures

Profit maximization, breakeven, and the four competitive environments

What This Reading Covers

The firm's objective is to **maximize profit**. How it does that — the price it charges, the quantity it produces, whether it earns economic profit in the long run — depends almost entirely on the **market structure** it operates in. This LM builds the cost/revenue toolkit, then applies it to the four canonical structures: **perfect competition, monopolistic competition, oligopoly, and monopoly**.

Learning Outcome Statements

LOS a	Determine and interpret breakeven and shutdown points of production, and how economies and diseconomies of scale affect costs under perfect and imperfect competition
LOS b	Describe characteristics of perfect competition, monopolistic competition, oligopoly, and pure monopoly
LOS c	Explain supply and demand relationships under monopolistic competition, including optimal price/output and pricing strategy
LOS d	Explain supply and demand relationships under oligopoly, including optimal price/output and pricing strategy
LOS e	Identify the type of market structure within which a firm operates, and describe the use and limitations of concentration measures

Exam Tip: The universal profit-max rule across *every* market structure is **MR = MC**. What changes between structures is the shape of the demand curve (and therefore the MR curve) faced by an individual firm.

LOS A · PROFIT FUNDAMENTALS

Accounting Profit vs. Economic Profit

The firm's objective is to maximize profit, where:

ECONOMIC PROFIT

$$\pi = TR - TC, \quad TR = P \times Q$$

π	economic profit	TR	total revenue
TC	total cost (explicit + implicit)	P	price per unit
Q	quantity sold		

ACCOUNTING PROFIT

TR − accounting (explicit) costs

Includes interest expense. Ignores what owners gave up by putting capital and effort into this business instead of somewhere else.

ECONOMIC PROFIT

Accounting profit − total implicit opportunity costs

Subtracts the *required rate of return on equity*. The benchmark for "did we create value?"

Normal Profit = Economic Profit of Zero

When economic profit = 0, the firm is earning exactly its required rate of return on equity — a "**normal profit**." This is the long-run equilibrium outcome in perfect and monopolistic competition.

- Economic profit **> 0** → *abnormal / supernormal* profit. Attracts entry.
- Economic profit **< 0** → firm earns less than RRR. Encourages exit.

What Produces Sustainable Economic Profit?

Long-run economic profit (a "**sustainable competitive advantage**") typically requires one or more *structural* sources:

1. **Cost advantage** — superior technology, efficiency, firm-specific resources
2. **Competitive advantage** — brand, network effects, IP
3. **Barriers to entry** — patents, licenses, scale
4. **Government policy / monopoly power**

Effect on Equity Value

Economic profit > 0 → positive effect on equity value. **= 0** → no effect. **< 0** → negative effect. Equity analysts care about *economic* profit, not just accounting profit.

LOS A · REVENUE CURVES

Total, Average, and Marginal Revenue

CONCEPT	DEFINITION	FORMULA
Total Revenue (TR)	Dollars brought in at a given quantity	P × Q
Average Revenue (AR)	Revenue per unit sold	TR / Q = P
Marginal Revenue (MR)	Revenue from one additional unit sold	ΔTR / ΔQ

Perfect Competition — Price Taker

Firms are price takers; each faces a **horizontal (perfectly elastic)** demand curve at the market price. Selling one more unit adds exactly P to revenue, so:

$$P = MR = AR = \text{Demand}$$

TR rises linearly with Q. Double the output, double the revenue — the firm's output decision does not move the market price.

Imperfect Competition — Downward-Sloping Demand

Monopolistic competition, oligopoly, and monopoly all face a downward-sloping individual demand curve. To sell one more unit the firm must cut price, so each additional unit brings in less than the previous one:

$$AR = P > MR \quad (\text{at every } Q > 0)$$

TR rises, peaks when MR = 0, then falls. Beyond that point, the price cut more than offsets the extra volume.

MR Formula for a Linear Demand Curve

Given demand Q = a − bP, rearrange to P = (a/b) − (1/b)Q. Then:

LINEAR DEMAND MR SHORTCUT

$$TR = P \times Q = \tfrac{a}{b}Q - \tfrac{1}{b}Q^2$$
$$MR = \frac{dTR}{dQ} = \frac{a}{b} - \frac{2}{b}Q$$

a,b	demand-curve constants (Q = a − bP)	MR	marginal revenue
TR	total revenue	Q	quantity sold

Result: the slope of MR is **twice** the slope of the demand curve. Both curves share the same Y-intercept; MR hits the X-axis at *half* the quantity where demand hits it.

Exam Tip: For any linear demand P = a − bQ, marginal revenue is MR = a − 2bQ. Memorize this shortcut — it appears in Cournot and monopoly optimization problems.

LOS A · COSTS, BREAKEVEN & SHUTDOWN

Cost Structure and the Two Critical Price Points

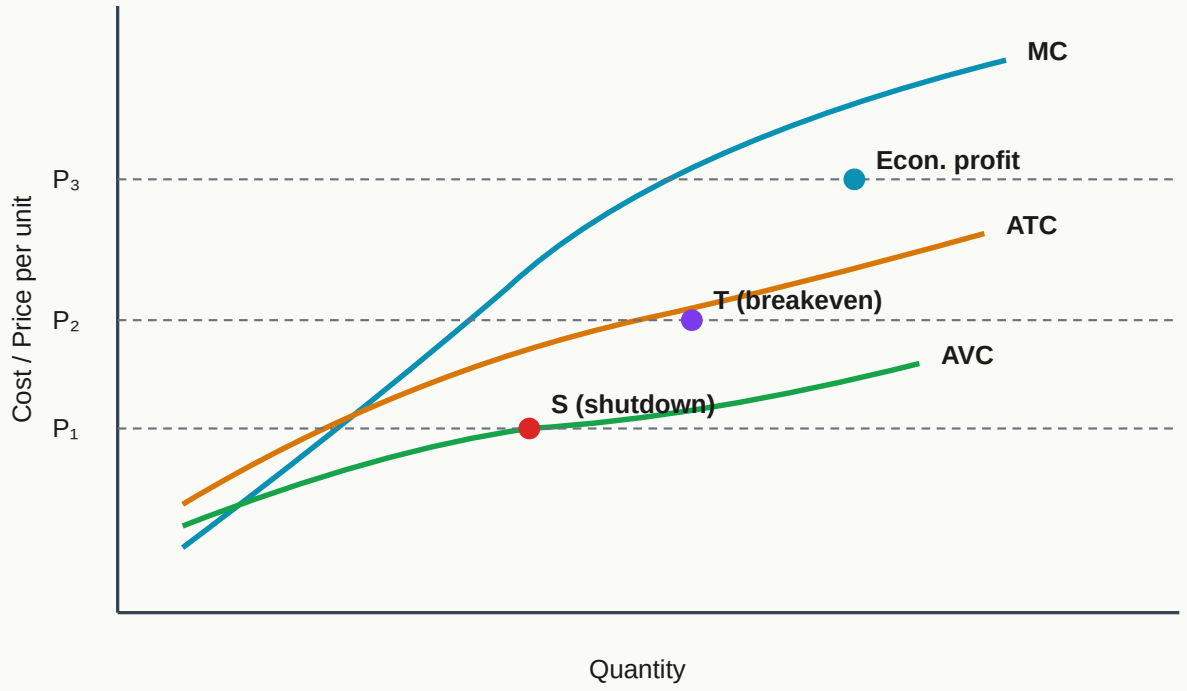
Cost Families

	TOTAL	AVERAGE (PER UNIT)	MARGINAL
Fixed (explicit + implicit)	TFC	AFC = TFC/Q	—
Variable	TVC	AVC = TVC/Q	—
Total	TC = TFC + TVC	ATC = TC/Q = AFC + AVC	MC = ΔTC/ΔQ

Key Geometric Facts

- If AVC is decreasing, MC < AVC. If AVC is increasing, MC > AVC.
- **MC intersects both AVC and ATC at their minimum points.**
- Q_{AVC} (minimum AVC) < Q_{ATC} (minimum ATC), because AFC keeps falling as Q rises, so ATC's minimum lies to the right of AVC's minimum.

BREAKEVEN & SHUTDOWN POINTS (PERFECT COMPETITION, SHORT-RUN)



Point S — Shutdown Point

Price = minimum AVC. Below S, the firm is not even covering variable cost per unit — it loses less by shutting down (losing TFC only) than by operating.

Point T — Breakeven Point (Economic BEP)

Price = minimum ATC. At T: TR = TC, ROE = RRR, economic profit = 0. P = AR = MR = ATC.

Short-Run vs. Long-Run Decision Rule

REVENUE VS. COST	SHORT RUN	LONG RUN
Price > ATC (above T)	Operate — economic profit	Operate
Price = ATC (at T)	Breakeven — operate	Breakeven — operate
AVC ≤ Price < ATC (S to T)	Operate — minimize loss	Exit
Price < AVC (below S)	Shut down	Exit

Exam Tip: In the short run, fixed costs are *sunk*. The firm keeps operating as long as revenue covers variable cost per unit (P ≥ AVC). In the long run, every cost is avoidable — if price < ATC, exit.

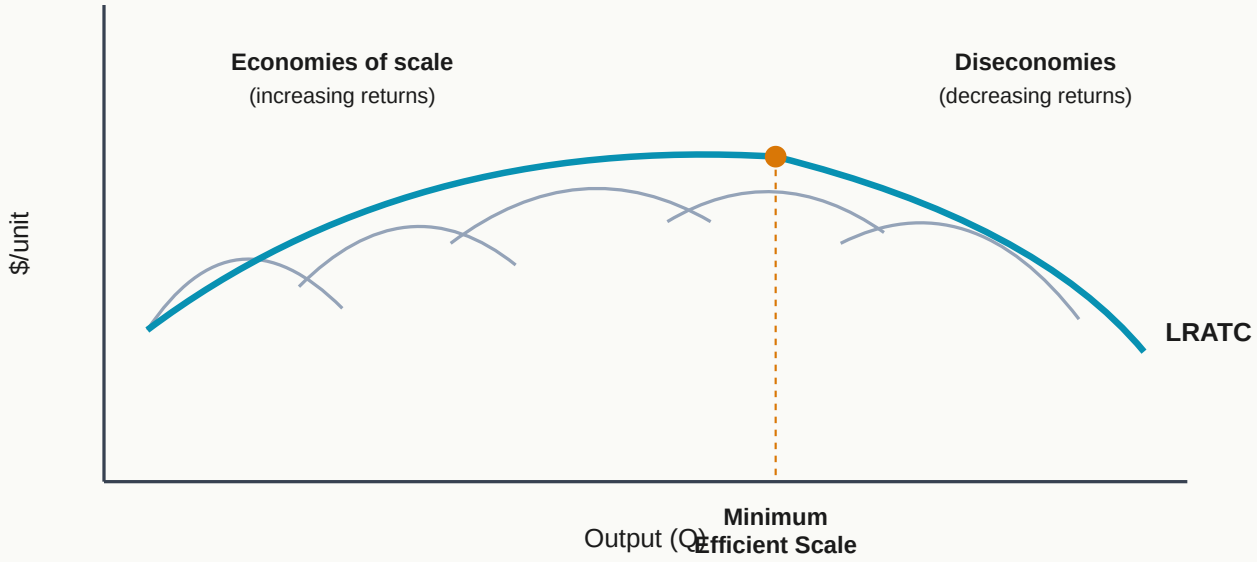
LOS A · ECONOMIES & DISECONOMIES OF SCALE

Long-Run ATC and the Minimum Efficient Scale

Short run: at least one factor of production is fixed (typically plant size / capital).
Long run: *all* factors are variable — the firm can choose plant size.

The **LRATC** curve is the lower envelope of all possible SRATC curves. Each SRATC belongs to a specific plant size; the firm picks the plant that gives lowest ATC at its chosen output.

LRATC — ECONOMIES, MINIMUM EFFICIENT SCALE, DISECONOMIES



Economies of Scale — LRATC Declining

Increasing returns. As Q rises, long-run cost per unit *falls*.

- Division of labor / specialization
- Productivity-enhancing equipment and technology
- Efficiency gains (waste and energy reduction)
- Superior market insight / better information use
- Volume discounts from suppliers

Diseconomies of Scale — LRATC Rising

Decreasing returns. Firm has grown past efficient size.

- Poor management control / oversight
- Overlap and duplication
- Greater stress on local supply markets
- Big target for unions, antitrust legislation, litigation

Minimum Efficient Scale (MES)

MES is the output level at which LRATC reaches its minimum. In perfect competition, long-run equilibrium forces each surviving firm to produce *at* MES — anything else would require a price below ATC, forcing exit.

QUIZ 1 · CHECKPOINT

Test Your Understanding: Profit, Revenue, Costs

Q1. A firm earns accounting profit of $500,000 and has implicit opportunity costs of $ 500,000. Its economic profit is:

Q2. For a firm in *imperfect* competition, which of the following is *most accurate*?

Q3. For a linear demand curve P = 120 − 2Q, marginal revenue is:

Q4. A competitive firm is selling at a price that is *below* its minimum ATC but *above* its minimum AVC. In the short run it should:

Q5. The *minimum efficient scale* is *best* described as the output level at which:

UNIVERSAL PROFIT-MAX RULE

MR = MC: The Rule for Every Market Structure

The Rule

In *every* market structure, a profit-maximizing (or loss-minimizing) firm produces the quantity where **MR = MC**. What differs across structures is only the *shape* of demand (and therefore MR).

Short-Run Decision (Perfect Competition)

In perfect competition MR = P. The firm takes the market price as given and finds Q*:

- **If P_1 > ATC at Q*:** economic profit > 0. Encourages *entry*, which puts downward pressure on price.
- **If P_2 < ATC at Q*:** economic loss. Encourages *exit*, which puts upward pressure on price.

Long-Run Adjustment

Suppose short-run cost is $SRATC_1$ with MC_1. The firm earns economic profit at price P_1. In the long run:

1. The firm can **invest in a larger plant**, shifting to $SRATC_2$ with lower MC_2.
2. Economic profits attract **new entrants**, which increases market supply.
3. Market price falls to P_2, where $MR_2 = MC_2$ and $P_2 = ATC_2$.
4. **Long-run equilibrium:** economic profit = 0. Each firm operates at the minimum of its LRATC (the minimum efficient scale).

Long-Run Equilibrium Condition, Perfect Competition

$$P = MR = MC = ATC = \min(LRATC)$$

All equalities hold simultaneously. Every firm is a price taker producing at minimum efficient scale, earning exactly normal profit.

Exam Tip: MR = MC maximizes profit; it does not *guarantee* profit. If that MR = MC quantity lies above ATC the firm earns economic profit; if below, it loses money but is minimizing that loss.

LOS B · THE FOUR MARKET STRUCTURES

The Competitive Spectrum

Perfect Competition	Monopolistic Competition	Oligopoly	Monopoly
Many firms	Many firms	Few firms	One firm

Five Distinguishing Characteristics

	PERFECT COMP.	MONOP. COMP.	OLIGOPOLY	MONOPOLY
1. Number & size of firms	Many	Many	Few	One
2. Product differentiation	Homogeneous / standardized	Differentiated (substitutes)	Homogeneous or differentiated	Unique (no substitutes)
3. Pricing power	None (price taker)	Some	Some to considerable	Considerable
4. Barriers to entry / exit	Very low	Low	High	Very high
5. Non-price competition	None	Advertising / differentiation	Advertising / differentiation	Advertising

Examples

Perfect comp: oranges, milk, wheat.
Monop. comp: toothpaste, restaurants.
Oligopoly: commercial airlines on a given route.
Monopoly: electricity/water utilities (often regulated).

Universal Rule Across All Four

Profit-maximizing quantity is where **MR = MC**. Only the *demand curve* changes shape across structures (horizontal in perfect comp → downward-sloping in the other three).

Exam Tip: Memorize the 5 × 4 grid cold. Exam questions typically describe a firm in one short sentence ("few large sellers, significant pricing power, high barriers to entry, branded products") and ask you to name the structure.

LOS B, C · PERFECT COMPETITION

Perfect Competition — Price Takers

Demand Analysis

Many small firms sell a homogeneous product. Each firm's output is trivial relative to the market, so the firm cannot move price.

- **Firm demand curve:** horizontal (infinitely elastic) at the market price
- **P = MR = AR = D**
- Price is industry-determined

Supply Analysis

Output is determined by the firm's **MC schedule**: produce where MR = MC, as long as P ≥ AVC.

- Short-run firm supply = MC above AVC
- Economic BEP at minimum ATC
- Shutdown at minimum AVC

Short-Run Equilibrium

A shift in market demand changes the price faced by every firm. If that price exceeds ATC, firms earn positive economic profit. If it lies between AVC and ATC, firms take an economic loss but continue operating in the short run.

Long-Run Equilibrium

Economic profit = 0 for every surviving firm.

$$P = MR = MC = ATC = \min(LRATC)$$

Entry/exit drives the market until no firm earns above its required return. All firms produce at the **minimum efficient scale**. Firms producing off MES are forced to exit because price equals minimum ATC.

Exam Tip: "Normal profit" ≠ zero profit in the accounting sense. It's the return that exactly compensates equity holders for their required rate of return (economic profit = 0).

LOS B, C · MONOPOLISTIC COMPETITION

Monopolistic Competition — Differentiated Products

Many firms, low barriers to entry, but each sells a **differentiated** product. The differentiation (brand, features, quality, location, advertising) gives the firm *some* pricing power, producing a downward-sloping individual demand curve.

Demand

- Downward-sloping (highly elastic — close substitutes exist)
- MR lies **below** the demand curve; slope of MR is 2× slope of D
- Some pricing power

Supply

- **No well-defined supply curve**
- Firm picks Q where MR = MC
- Then reads P off the demand curve at that Q

Short-Run Equilibrium

At MR = MC quantity Q*, set P from the demand curve. If P > ATC at Q*, economic profit > 0. Profit = (P − ATC) × Q*.

Long-Run Equilibrium

Positive economic profit attracts entry. New differentiated products compete for customers, shifting each existing firm's demand curve down and left until:

- MR = MC (profit-max quantity)
- P = ATC (tangent to ATC at that Q) → economic profit = 0

Unlike perfect competition, Q* in monopolistic competition is *not* at the minimum of ATC — the demand curve is downward-sloping, so tangency occurs on the declining portion of ATC.

Efficiency Verdict

Relative to perfect competition, monopolistic competition produces **higher price and lower quantity**. However consumers gain from variety, branding information, product innovation, and differentiation. Net welfare effect is unclear.

LOS B, D · OLIGOPOLY — PART 1

Oligopoly and the Kinked Demand Curve

Few firms, **high barriers to entry**, and products that may be homogeneous (e.g., steel) or differentiated (e.g., cars, airlines). The defining feature: **pricing interdependence** — each firm's optimal price depends on what its rivals do.

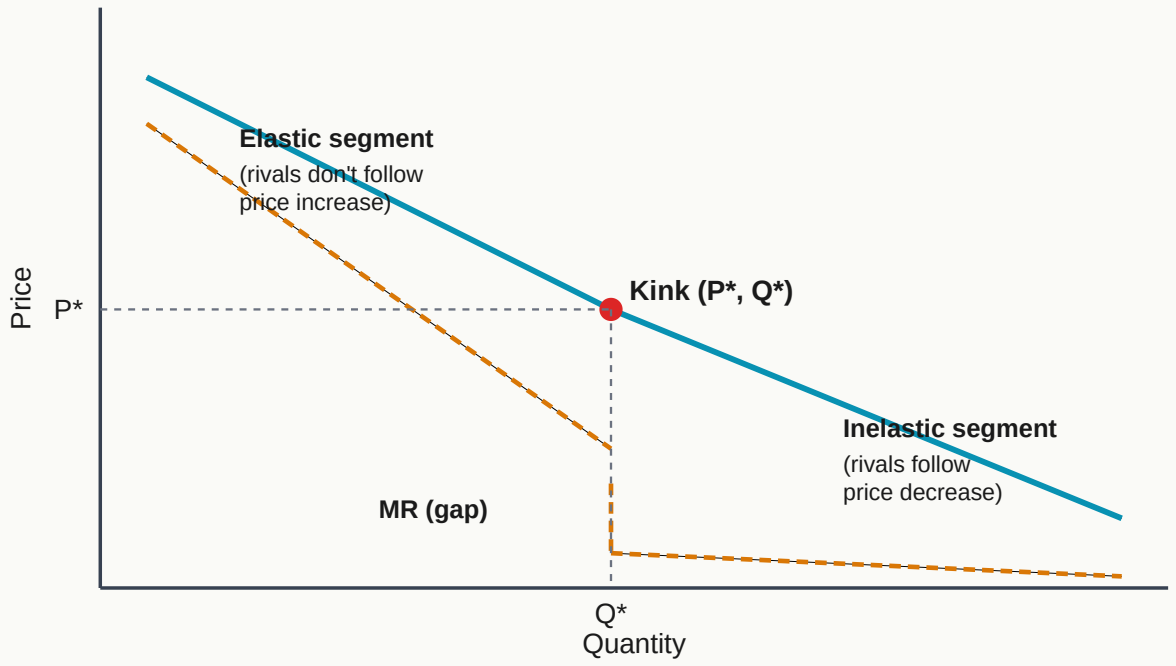
There is no single oligopoly model. The curriculum covers five:

1 · Kinked demand | 2 · Cournot | 3 · Nash | 4 · Stackelberg | 5 · Dominant firm

Model 1 — Kinked Demand Curve

Assumption: competitors *will not follow* a price **increase**, but they *will follow* a price **decrease**.

KINKED DEMAND CURVE



Key Implications

- **Above** current price: demand is highly *elastic* (rivals don't follow — the firm loses heaps of market share)
- **Below** current price: demand is highly *inelastic* (rivals match — nobody gains share)
- Kink in demand creates a **vertical gap in MR**. MC can shift anywhere within that gap without changing the profit-max (P*, Q*).

- **Limitation:** the model explains why P is sticky but *does not explain where the kink price came from* in the first place.

QUIZ 2 · CHECKPOINT

Test Your Understanding: Market Structures

Q6. A market characterized by *many* sellers, *differentiated* products, and *low* barriers to entry is *best* described as:

Q7. Which market structure is *most likely* to have firms earning economic profit in both the short run and the long run?

Q8. In the long-run equilibrium of *perfect competition*, each surviving firm:

Q9. Under the kinked demand curve model, demand *above* the current market price is:

Q10. In monopolistic competition's long-run equilibrium, economic profit is zero because:

LOS D · OLIGOPOLY — PART 2

Model 2 — Cournot Duopoly

Setup: Two firms with identical cost structures selling an identical product. Each firm chooses its output *simultaneously*, assuming the other firm's output will **not change**. Market price is determined by total output ($q_1 + q_2$).

Long-run result: both firms produce equal quantities. The Cournot equilibrium price sits *between* the monopoly price (highest) and the perfect-competition price (lowest). As the number of firms increases, Cournot converges to the perfect-competition outcome.

WORKED EXAMPLE · COURNOT EQUILIBRIUM

Finding q_1, q_2, and market price

GIVEN

Market demand: $Q_D = 450 - P$, so $P = 450 - Q_D$, where $Q_D = q_1 + q_2$.

Marginal cost for both firms: MC = 30.

FIND

Each firm's output q_1, q_2, total Q, and market price P in Cournot equilibrium.

SOLUTION

SOLUTION

1. Write each firm's TR using $P = 450 - q_1 - q_2$:

$$TR_1 = (450 - q_1 - q_2)\cdot q_1 = 450q_1 - q_1^2 - q_1\cdot q_2$$

$$TR_2 = (450 - q_1 - q_2)\cdot q_2 = 450q_2 - q_1\cdot q_2 - q_2^2$$

2. Compute each firm's MR (derivative with respect to own output):

$$MR_1 = dTR_1/dq_1 = 450 - 2q_1 - q_2$$

$$MR_2 = dTR_2/dq_2 = 450 - q_1 - 2q_2$$

3 Set each MR = MC = 30:

$$450 - 2q_1 - q_2 = 30 \rightarrow 2q_1 + q_2 = 420$$

$$450 - q_1 - 2q_2 = 30 \rightarrow q_1 + 2q_2 = 420$$

4 By symmetry $q_1 = q_2$. Substitute into either equation:

$$3q_1 = 420 \rightarrow q_1 = q_2 = 140$$

5 Total market quantity and price:

$$Q = q_1 + q_2 = 280, \quad P = 450 - 280 = 170$$

$$\mathbf{q_1 = q_2 = 140,\ Q = 280,\ P = 170}$$

Compare with Monopoly and Perfect Competition

Using the same demand ($TR_{monopoly} = 450Q - Q^2$, $MR = 450 - 2Q = 30 \rightarrow Q_m = 210$, $P_m = 240$). Under perfect competition, $P_{PC} = MC = 30$, $Q_{PC} = 420$. Cournot ($P = 170$, $Q = 280$) sits between them — exactly the expected ranking.

LOS D · OLIGOPOLY — PART 3

Models 3 & 4 — Nash Equilibrium and Stackelberg

Nash Equilibrium

Definition: a set of strategies, one per firm, such that no firm can obtain a higher payoff by unilaterally changing its strategy, holding all other firms' strategies constant. Each firm acts in its own best interest; no collusion.

Cournot is a *special case* of Nash equilibrium where the strategy variable is quantity.

WORKED EXAMPLE

Prisoner's Dilemma — Pricing Version

Firms X and Y have agreed to keep a high price. Payoffs:

	Y RESPECTS (HIGH)	Y CHEATS (LOW)
X respects (high)	X = 200, Y = 200	X = 50, Y = 350
X cheats (low)	X = 350, Y = 50	X = 150, Y = 150

SOLUTION

Nash equilibrium: both cheat (low, low).

Whatever Y does, X is better off cheating: if Y respects, X gets 350 by cheating vs. 200; if Y cheats, X gets 150 vs. 50. The same logic applies to Y. Even though cooperation (200, 200) Pareto-dominates the equilibrium, neither firm can unilaterally sustain it — which is why collusive agreements are hard to maintain.

Stackelberg Model

Setup: duopoly with *sequential* rather than simultaneous moves. One firm (the **leader**) chooses its output first, committing to a potentially aggressive level; the other firm (the **follower**) responds optimally.

- Leader produces more and earns more profit than follower
- Follower is forced to scale back production
- Contrasts with Cournot, where simultaneous moves yield equal output and equal profit

Exam Tip: Memorize the move timing: **Cournot = simultaneous quantity**; **Stackelberg = sequential quantity (leader then follower)**. Stackelberg gives the leader a first-mover advantage.

LOS D, B · DOMINANT FIRM + MONOPOLY

Model 5 — Dominant Firm & Pure Monopoly

Dominant Firm Model

One firm has a significant cost advantage (lowest cost structure, greatest capacity, strongest brand) and a large share of the market. The dominant firm acts as a **price leader**:

1. Dominant firm sets price where $MR_{DF} = MC_{DF}$
2. Smaller "fringe" firms accept this price and set their output accordingly
3. Empirically, the dominant firm's market share *declines over time* as other firms adopt more efficient techniques

Summary of Oligopoly Pricing

- **Kinked demand:** price at the kink
- **Cournot:** simultaneous quantities; equilibrium between monopoly and PC
- **Nash:** each firm optimizes given rivals' strategies; may cheat out of collusion
- **Stackelberg:** leader first, follower reacts; leader earns more
- **Dominant firm:** price-leader sets P where $MR_{DF} = MC_{DF}$; followers take P

For the dominant-firm oligopoly (the only supply model in the curriculum): no well-defined supply function; profit-max at MR = MC; equilibrium price from the demand curve.

Pure Monopoly

A single seller, no close substitutes, and very high barriers to entry. Sources of barriers:

- Patents and copyrights
- Control over critical resources
- Government authorization (e.g., natural monopolies in utilities)
- Network effects
- Substantial economies of scale

Demand = market demand (downward sloping). **No well-defined supply function** — the profit-max condition MR = MC identifies a single price-quantity point, not a supply schedule.

Short-run *and* long-run: monopoly earns economic profit (barriers prevent entry from eroding it).

Regulation of Monopoly

OUTCOME	PRICE / QUANTITY
Unregulated monopoly	MR = MC → (P_M, Q_M). Maximum economic profit.
P = LRMC (+ subsidy up to LRAC)	Efficient price but requires subsidy because LRMC < LRAC on the declining portion.
P = LRAC (authorized / regulated monopoly)	Firm earns normal profit; (P_R, Q_R).
National ownership	State-owned enterprise produces the good directly.

LOS E · IDENTIFYING MARKET STRUCTURE

Concentration Ratio and Herfindahl–Hirschman Index

N-Firm Concentration Ratio

$$CR_N = \sum_{i=1}^{N} s_i$$

Range: 0% (perfect competition) to 100% (oligopoly/monopoly).

Advantage: simple to calculate and understand.

Disadvantages: ignores barriers to entry; does not measure market power or elasticity of demand; may be *unaffected* by M&A among the top N firms.

Herfindahl–Hirschman Index (HHI)

$$HHI = \sum_{i=1}^{N} s_i^2$$

s_i	market share of firm i
N	number of largest firms included

Range (decimal): 0 (perfect comp.) → 1 (monopoly). For M firms with equal share: HHI = 1/M.

Advantage: commonly used by regulators; responds to mergers among large firms.

Disadvantages: same as CR — does not consider entry potential or demand elasticity.

WORKED EXAMPLE

Mini-check. Ten suppliers each hold 10% market share. What is HHI?

SOLUTION

HHI = 10 × $(0.10)^2$ = 10 × 0.01 = **0.10**.

Equivalent formula for equal shares: HHI = 1/M = 1/10 = 0.10.

WORKED EXAMPLE · MERGER EFFECT ON CR & HHI

Detecting hidden consolidation

GIVEN

FIRM	MARKET SHARE
Bruce	30%

Clark	20%
Flash	15%
Peter	10%
Xavier	10%
James	5%

FIND

4-firm concentration ratio and HHI, before and after Bruce & Clark merge.

SOLUTION

SOLUTION

1. **Pre-merger CR_4** (top four: Bruce, Clark, Flash, Peter):

$$CR_4 = 30 + 20 + 15 + 10 = 75\%$$

2. **Post-merger:** BruceClark has 50%; new top four = BruceClark, Flash, Peter, Xavier:

$$CR_4 = 50 + 15 + 10 + 10 = 85\%$$

CR only went up by 10 points, even though the largest firm's share jumped from 30% to 50% — a key limitation.

3. **Pre-merger HHI** (square each of the largest firms' shares):

$$HHI = 0.30^2 + 0.20^2 + 0.15^2 + 0.10^2 = 0.09 + 0.04 + 0.0225 + 0.01 = 0.1625$$

4. **Post-merger HHI:**

$$HHI = 0.50^2 + 0.15^2 + 0.10^2 + 0.10^2 = 0.25 + 0.0225 + 0.01 + 0.01 = 0.2925$$

CR: 75% → 85% (+10 pts) | HHI: 0.1625 → 0.2925 (+80%)

Takeaway: HHI shows a much larger change because it squares market shares, better capturing the increase in the merged firm's dominance. This is why regulators prefer HHI.

Exam Tip: Be able to compute both CR and HHI before and after a hypothetical merger, and be able to explain *why* HHI responds to large-firm mergers while CR may not. Also memorize: neither measure accounts for potential entry (low barriers) or demand elasticity.

QUIZ 3 · CHECKPOINT

Test Your Understanding: Oligopoly & Measurement

Q11. Two firms in a Cournot duopoly face demand $P = 120 - Q$ (where $Q = q_1 + q_2$) and each has $MC = 20$. In equilibrium, each firm produces:

Q12. In the Stackelberg oligopoly model, compared with Cournot:

Q13. A market has four firms with market shares 40%, 30%, 20%, 10%. Its HHI is *closest to*:

Q14. The main limitation *shared by both* the N-firm concentration ratio and the HHI is that they:

Q15. In the "prisoner's dilemma" pricing matrix where both firms earn more if they cooperate (high price) but each is individually better off cheating (low price), the *Nash equilibrium* is:

MODULE COMPLETE

Your Scorecard

0 / 15

LM01 Key Takeaways — Exam-Ready Cheat Sheet

Profit, Costs, and Short-Run Decisions

1. **Economic profit** = accounting profit − implicit opportunity costs (including required return on equity). Normal profit = economic profit of 0.
2. **Breakeven** at minimum ATC. **Shutdown** at minimum AVC. MC intersects AVC and ATC at their minimums.
3. **SR rule:** operate if P ≥ AVC. **LR rule:** operate only if P ≥ ATC.
4. **MES** = output at minimum LRATC. Economies of scale (↓ LRATC) vs. diseconomies (↑ LRATC).

Universal Profit Rule and Revenue Shortcut

5. **MR = MC** maximizes profit in every market structure.
6. **Linear demand P = a − bQ ⇒ MR = a − 2bQ**. Slope of MR is twice the slope of demand.
7. **Perfect competition**: P = MR = AR = D (horizontal). **Imperfect**: AR = P > MR.

Four Market Structures — Five Characteristics

	PC	MC	OLIGOPOLY	MONOPOLY
# firms	Many	Many	Few	One
Differentiation	Homog.	Diff.	Either	Unique

Pricing power	None	Some	Some → sig.	Considerable
Barriers	Very low	Low	High	Very high
Non-price	None	Adv./diff.	Adv./diff.	Adv.

8. **LR zero economic profit** in PC and MC (entry/exit). **Positive economic profit** in monopoly (high barriers).

Oligopoly Models

9. **Kinked demand:** price at the kink. Elastic above, inelastic below. Gap in MR — explains sticky prices.
10. **Cournot:** simultaneous quantities, symmetric outcome between monopoly and PC.
11. **Nash:** no firm can unilaterally improve. Prisoner's dilemma: both cheat; collusion unstable.
12. **Stackelberg:** sequential (leader then follower). Leader produces more, earns more.
13. **Dominant firm:** leader sets P where $MR_{DF} = MC_{DF}$; fringe firms are price takers.

Identifying Structure

14. **N-firm CR** = Σ top-N market shares. 0% = PC, 100% = oligopoly/monopoly. Simple but insensitive to large-firm mergers and ignores entry/elasticity.
15. **HHI** = Σ (share)² over largest firms. 1/M for M equal firms. Range 0 → 1. Responds to concentration better; still ignores entry/elasticity.

Last-Minute Exam Checklist

Profit-max (all structures): MR = MC

Linear MR shortcut: P = a − bQ ⇒ MR = a − 2bQ

SR shutdown: P < AVC. **SR breakeven:** P = ATC. **LR exit:** P < ATC.

PC LR: P = MR = MC = ATC = min LRATC (zero econ. profit, firm at MES)

MC LR: P = ATC at MR = MC (zero econ. profit, but NOT at min ATC)

Monopoly: economic profit in both SR and LR (barriers block entry)

Cournot: simultaneous Q; **Stackelberg:** sequential Q (leader wins)

HHI = Σs^2 | **CR_N** = Σs | both ignore entry barriers and demand elasticity

Step 1 of 18