

Information and market power (2.10-2.11)

International Baccalaureate · IB Diploma · Economics · HL

Information and market power

IB Diploma Programme Economics HL, Unit 2 *Microeconomics* (first assessment 2022). This topic covers the two HL market failures: **asymmetric information** (2.10) and **market power** (2.11). Market power needs the four **market structures**, so you also learn perfect competition, monopoly, monopolistic competition and oligopoly here. All numbers are original, and each diagram is drawn from them.

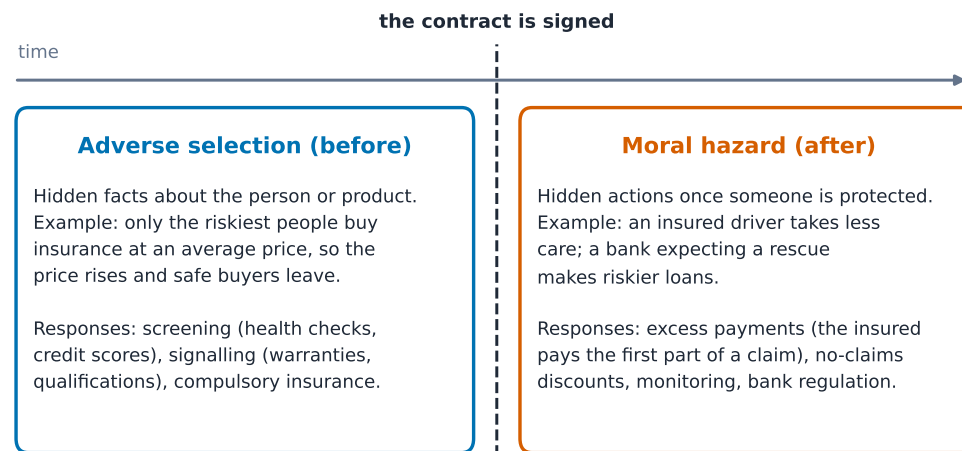
In April 2021 China's market regulator fined Alibaba 18.2 billion yuan. The platform had told sellers they could not also sell on rival platforms. A firm can only give such orders when buyers and sellers have few other choices: that is market power. This topic explains where such power comes from, why it makes markets fail, and what governments can do about it.

Must-know for this topic:

Idea	Key relationship
information gaps	adverse selection BEFORE the deal; moral hazard AFTER it
profit rule	every firm produces where $MR = MC$
profit	abnormal if $P > ATC$; normal if $P = ATC$; a loss if $P < ATC$
efficiency	allocative: $P = MC$; productive: output at the lowest ATC
perfect competition	$P = MR$; entry and exit bring normal profit in the long run
monopoly	$MR = MC$ at $Q = 40$, $P = 50$; profit 300; deadweight loss 200
natural monopoly	AC still falling where demand meets it; regulate the price
monopolistic competition	short-run profit; long run $P = ATC$ with excess capacity
oligopoly	interdependence; game theory; collusion or competition
concentration	$CR4$ = shares of the four largest firms added

Asymmetric information

Asymmetric information (2.10) means one side of a deal knows more than the other. The seller of a used car knows its faults. A person buying health insurance knows their own health. A borrower knows how likely they are to repay. When information is unequal, the market can fail. Some trades that would help both sides do not happen, and some trades that happen are bad ones.



Adverse selection comes before the contract; moral hazard comes after it

■ Adverse selection

Adverse selection happens BEFORE the contract. One side hides facts about itself or its product. Think of a used-car market where buyers cannot tell good cars from bad ones ("lemons"). Buyers will only pay an average price. Owners of good cars will not sell at that price, so they leave the market. Now the average car is worse, so buyers offer even less. In the end mostly bad cars are left. Insurance works the same way: at one average price, the riskiest people buy most and the safest people buy less.

■ Moral hazard

Moral hazard happens AFTER the contract. Once someone is protected, they take more risk, because someone else pays for the damage. An insured driver may drive less carefully. A bank that expects the government to rescue it may make riskier loans.

■ Responses to asymmetric information

- **Screening** : the side with less information collects it. Insurers ask for health checks; banks check credit scores.
- **Signalling** : the side with more information proves its quality. Sellers offer a **warranty** ; workers show qualifications.
- **Government regulation** : rules that force sellers to tell the truth (food labels, car inspection reports), licences for doctors and lawyers, and compulsory insurance so the low-risk people stay in.
- **Contract design**: an **excess** (the insured person pays the first part of any claim) and no-claims discounts keep some risk with the insured, which reduces moral hazard.

Each response has a limit. Screening costs money. A signal can be faked. Regulation needs inspectors who can be trusted.

Revenue, costs and profit

■ The profit-maximising rule

Every firm in this topic is assumed to want the most profit. It compares the extra revenue and the extra cost of one more unit:

- **Total revenue** (TR) = $P \times Q$.
- **Average revenue** (AR) = TR/Q , which is the price. So the AR curve is the firm’s demand curve.
- **Marginal revenue** (MR) is the extra revenue from selling one more unit.
- **Marginal cost** (MC) is the extra cost of producing one more unit, and **average total cost** (ATC) is total cost $/Q$.

The rule for **profit maximisation** is to produce where **MR = MC**. Below that output, one more unit adds more to revenue than to cost, so profit rises. Above it, one more unit adds more to cost, so profit falls.

■ **Worked example.** A firm faces the demand curve $P = 70 - Q/2$.

Output Q	Price P	$TR = P \times Q$
20	60	1,200
40	50	2,000
60	40	2,400
80	30	2,400

TR rises by 800 from 20 to 40 units, but only by 400 from 40 to 60 units. MR falls because the firm must lower the price on ALL its units to sell one more. For a straight-line demand curve, the MR line starts at the same point and is twice as steep: here $MR = 70 - Q$. MR is zero at $Q = 70$, where TR is largest.

■ Three kinds of profit

Economists count the owner’s next-best use of their money and time as a cost. **Normal profit** is the least profit that keeps the owner in this business. It is already inside ATC. So:

- **abnormal profit** : price above ATC ($P > ATC$);
- **normal profit**: price equal to ATC ($P = ATC$);
- **loss** : price below ATC ($P < ATC$).

Profit (or loss) per day = $(P - ATC) \times Q$.

■ Two kinds of efficiency

- **Allocative efficiency** : $P = MC$. The value buyers put on the last unit equals the cost of making it, so society gets the right amount.
- **Productive efficiency** : the firm produces at the lowest point of its ATC curve, so nothing is wasted in production.

Compare each market structure against these two tests.

Perfect competition

■ Characteristics

Perfect competition is a model with:

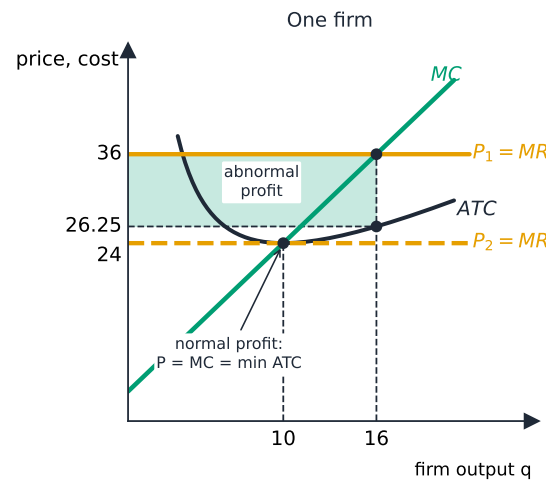
- very many small firms and buyers;
- **homogeneous** (identical) products, such as one farmer’s wheat and another’s;
- no **barriers to entry** , so firms can enter or leave freely;
- perfect information for everyone.

No single firm can change the market price. If it charged more, buyers would go to another firm. Each firm is a **price-taker** : the market’s price is its demand curve, and also its AR and MR ($P = AR = MR$).

■ Short run and long run

■ **Worked example.** One firm’s costs give $MC = 4 + 2q$ and $ATC = 100/q + 4 + q$.

1. *Short run.* The market price is 36. $MR = MC$: $36 = 4 + 2q$, so $q = 16$. ATC at 16 is $100/16 + 4 + 16 = 26.25$. Abnormal profit = $(36 - 26.25) \times 16 = 156$ per day.
2. *Entry.* There are no barriers, so new firms join. Market supply shifts right (S1 to S2) and the price falls.
3. *Long run.* Entry stops when profit is normal. That happens at the lowest ATC: $q = 10$, $ATC = 10 + 4 + 10 = 24$. At $P = 24$, $MR = MC$ gives $24 = 4 + 2q$, so $q = 10$ and $P = ATC$.



Abnormal profit attracts new firms until the price falls to the lowest ATC

It also works the other way. If the price is below ATC, firms make losses. Some leave the market, supply shifts left, and the price rises until the remaining firms earn normal profit.

In the long run, $P = MC$ (allocatively efficient) and output is at the lowest ATC (productively efficient). This is why perfect competition is the benchmark for judging the other structures. Real markets are rarely perfect, but some farm markets come close.

Monopoly

■ Characteristics and barriers to entry

A **monopoly** is one firm supplying the whole market, with no close **substitutes**. In practice, a firm with a very large share can act like a monopoly (UK competition law uses a 25% share as one test). A monopolist is a **price-maker**: it faces the downward-sloping market demand curve, so it chooses a price and accepts the quantity buyers then want.

Its power lasts only while **barriers to entry** keep rivals out:

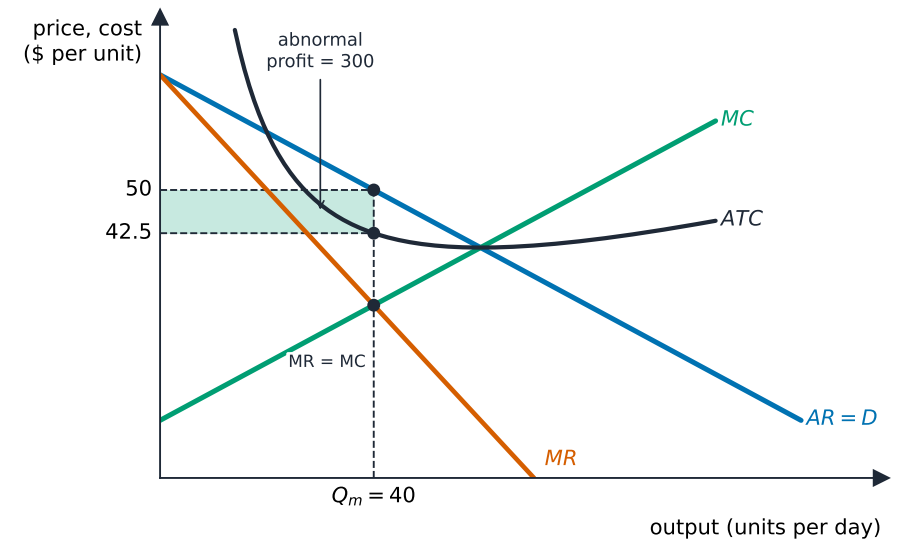
- **economies of scale** : a big firm's low cost per unit means a small entrant cannot compete;
- legal barriers: **patents**, licences and copyrights;
- control of an essential resource, such as a mine or a port;
- strong brands and heavy advertising;
- **network effects** : a platform is more useful when everyone else already uses it, as with social media and online shopping sites.

■ The monopoly diagram

The monopolist uses the same rule as every firm. With demand (AR) $P = 70 - Q/2$, $MR = 70 - Q$ and $MC = 10 + Q/2$:

$$70 - Q = 10 + \frac{Q}{2} \Rightarrow 60 = 1.5Q \Rightarrow Q_m = 40$$

The firm charges the highest price buyers will pay for 40 units, read from the demand curve: $P_m = 70 - 40/2 = 50$. Its ATC is $900/Q + 10 + Q/4$, so at 40 units $ATC = 22.5 + 10 + 10 = 42.5$. Abnormal profit $= (50 - 42.5) \times 40 = 300$ per day. Barriers to entry stop new firms from competing it away, so the profit can last into the long run.



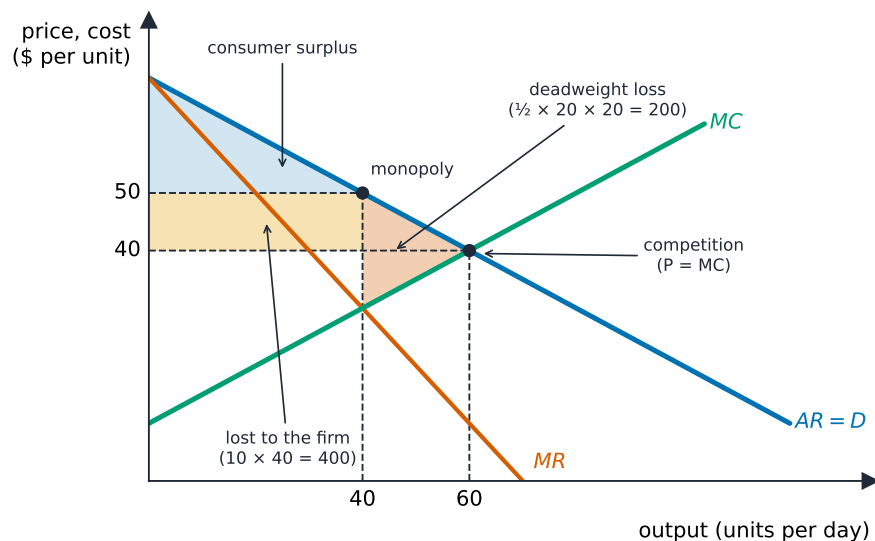
The monopolist produces where $MR = MC$ and sets the price from the demand curve

Notice that $MR = MC$ happens where MC is 30, but the price is 50. A monopolist always sets the price above marginal cost.

■ Monopoly and efficiency

Compare the monopoly with a competitive market facing the same demand and cost. Under competition, output goes to where $P = MC$: $70 - Q/2 = 10 + Q/2$, so $Q = 60$ and $P = 40$.

- The monopolist produces 20 fewer units and charges 10 more.
- Consumers lose $(50 - 40) \times 40 = 400$ per day to the firm as a higher price.
- The units from 40 to 60 are not made, though buyers value them above their cost. This is the **deadweight loss** : $\frac{1}{2} \times (60 - 40) \times (50 - 30) = 200$ per day.



Compared with competition, monopoly takes 400 from consumers and destroys 200 of welfare

So a monopoly is allocatively inefficient ($P = 50 > MC = 30$). It is also productively inefficient: its ATC is lowest at 60 units ($ATC = 40$), but it produces only 40. Without competition, managers may also let costs rise above the lowest possible level. This is called **X-inefficiency**.

■ The case for large firms

Size can also help consumers:

- **Economies of scale** can make costs so low that even the monopoly price is below what small competing firms could charge.
- **Abnormal profit** can pay for **research and development** (R&D): new medicines, phones and software often come from large, profitable firms. This is **dynamic efficiency**, improvement over time.
- A monopoly that is open to a world market may still face strong foreign competition.

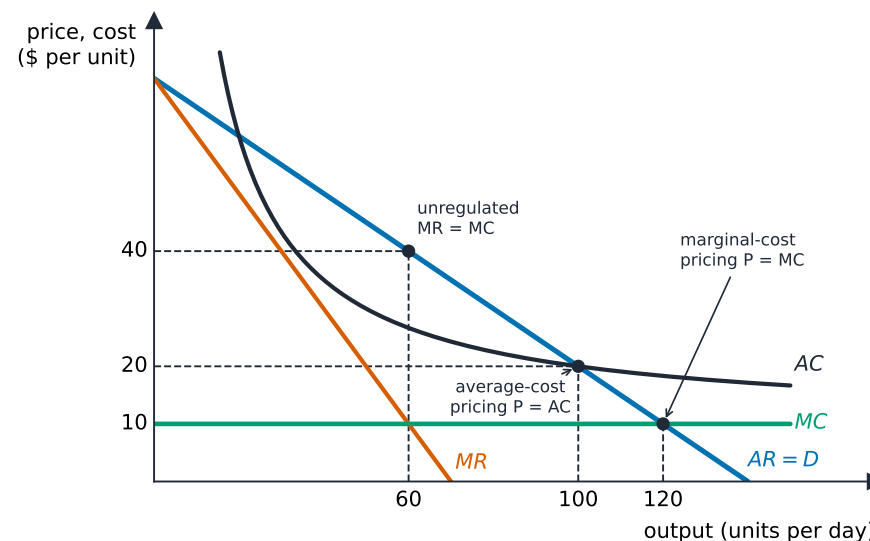
An evaluation compares these gains with the deadweight loss, and asks whether the barriers protect real advantages or just protect profit.

■ Natural monopoly

A **natural monopoly** is an industry where one firm can supply the whole market at a lower cost than two or more firms. The reason is a very large fixed cost: one water network, one electricity grid, one railway line. Average cost keeps falling across the whole market demand. Splitting the firm would raise costs, so governments regulate it instead.

Worked example. Demand is $P = 70 - Q/2$, MC is a constant 10, and the fixed cost is 1,000 per day, so $AC = 10 + 1000/Q$.

Rule	Output	Price	Result
unregulated: $MR = MC$	60	40	abnormal profit $= (40 - 10) \times 60 - 1000 = 800$
marginal-cost pricing: $P = MC$	120	10	allocatively efficient, but a loss of 1,000 (the fixed cost)
average-cost pricing: $P = AC$	100	20	normal profit; most of the efficiency gain

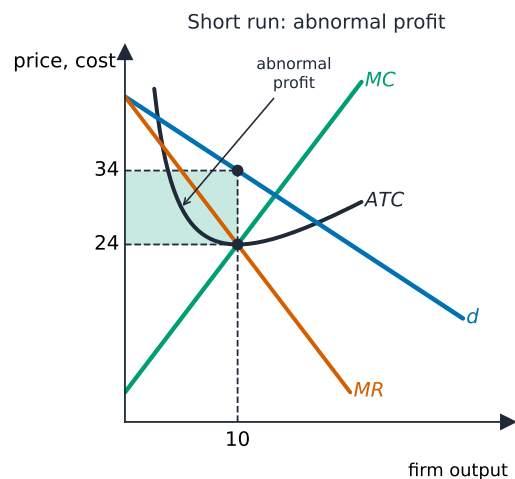
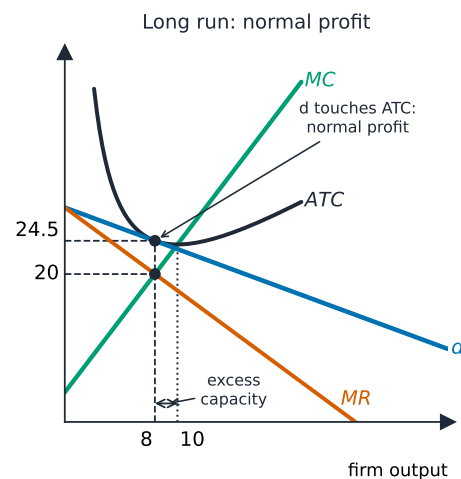


Regulating a natural monopoly: $P = MC$ is efficient but makes a loss; $P = AC$ breaks even

Marginal-cost pricing needs a **subsidy** of 1,000 a day, or the firm closes. Average-cost pricing needs no subsidy and still raises output from 60 to 100. Many governments choose this, or own the firm themselves.

Monopolistic competition

Monopolistic competition has many firms, low barriers to entry and **product differentiation**: each firm's product is a little different. Milk-tea shops, hair salons and restaurants are examples. Each firm has a few loyal customers, so it faces its own downward-sloping demand curve (d). But there are many close substitutes, so demand is quite elastic. Firms compete with **non-price competition**: brands, advertising, location, service and new flavours.



New firms take customers until each firm's demand curve just touches ATC

Worked example. One shop has $MC = 4 + 2q$ and $ATC = 100/q + 4 + q$.

1. *Short run.* Demand is $P = 44 - q$, so $MR = 44 - 2q$. $MR = MC$ gives $q = 10$ and $P = 34$. ATC is 24, so abnormal profit $= (34 - 24) \times 10 = 100$.
2. *Long run.* The profit attracts new shops nearby. Each shop loses customers, so its demand curve shifts left. Entry stops when demand just touches the ATC curve: here at $q = 8$, where $P = ATC = 24.5$ and profit is normal.

In the long run the firm is still inefficient. Its price (24.5) is above MC (20), so it is not allocatively efficient. It produces 8 units, not the 10 where ATC is lowest, so it is not productively efficient either. This gap is **excess capacity**: the shop could serve more customers at a lower cost per customer. In return, consumers get more variety.

Oligopoly

■ Characteristics

An **oligopoly** is a market with a few large firms and high barriers to entry. Products may be the same (oil, steel) or differentiated (cars, phones, airlines). The key feature is **interdependence**: each firm's best choice depends on what its rivals do. If one airline cuts its fares, the others lose passengers unless they cut too.

■ Game theory

Game theory studies choices that depend on what others choose. A payoff matrix shows each firm's profit for each pair of choices.

		Airline B		
		high fare	low fare	
Airline A	high fare	A: 20 B: 20	A: 8 B: 28	
	low fare	A: 28 B: 8	A: 12 B: 12	
yearly profit, \$ million				collusion: best for both Nash equilibrium

Each airline does better with a low fare whatever the other does, so both end on 12

Read it from Airline A's side:

- If B sets a high fare, A earns 20 with a high fare or 28 with a low fare. Low is better.
- If B sets a low fare, A earns 8 with a high fare or 12 with a low fare. Low is better again.

So a low fare is A's **dominant strategy**: its best choice whatever B does. The same is true for B. Both choose low and earn 12 each. Neither can gain by changing alone, so this is the **Nash equilibrium**. But both would earn 20 if both kept fares high. This "prisoner's dilemma" explains both sides of oligopoly: the reward for working together, and the temptation for each firm to cheat.

■ Collusion and competition

- **Collusion**: firms agree to limit output or fix prices, moving towards the monopoly outcome. A formal agreement is a **cartel**. OPEC, a group of oil-exporting countries, sets output targets for its members. Cartels between firms are illegal in most countries, including China.
- **Tacit collusion**: no agreement is made, but firms follow each other. One firm acts as **price leader** and the others copy its prices.
- **Non-collusive oligopoly**: firms compete. A **price war** can push prices close to cost. Because price cuts are quickly copied, most oligopolies prefer non-price competition: advertising, brands and new models.

Cartels tend to break down. Each member can gain by secretly producing more than its quota, exactly as in the game above.

■ Measuring concentration

A **concentration ratio** adds the market shares of the largest firms. If the five largest firms have shares of 40%, 25%, 15%, 10% and 10%, the four-firm ratio is $CR4 = 40 + 25 + 15 + 10 = 90\%$: a highly concentrated market. The ratio has limits. It ignores foreign rivals and imports. It does not show whether the largest firm has 40% or 85% of a CR4 of 90. And it says nothing about how firms actually behave.

Comparing the market structures

	Perfect competition	Monopolistic competition	Oligopoly	Monopoly
number of firms	very many	many	a few	one
product	identical	differentiated	identical or differentiated	unique
barriers to entry	none	low	high	very high
control over price	none (price-taker)	some	considerable	great (price-maker)
long-run profit	normal	normal	often abnormal	often abnormal
allocatively efficient?	yes ($P = MC$)	no	usually no	no
productively efficient?	yes	no (excess capacity)	usually no	no

Government responses to market power

Market power is a market failure because output is too low and the price too high ($P > MC$). Governments respond in several ways:

- **Competition law** : bans cartels and the abuse of a dominant position, and can block **mergers** that would create too much power. In 2017 the European Commission fined Google 2.42 billion euros for favouring its own shopping service in search results.
- **Regulation**: price caps and quality targets for natural monopolies such as water and electricity.
- **Fines** that are large enough to make breaking the law unprofitable.
- **Government ownership** (nationalisation) of natural monopolies.

- **Trade liberalisation** : removing tariffs lets foreign firms compete with a domestic monopoly.

Each response has costs. Regulators may lack information about the firm's true costs (asymmetric information again). Breaking up a firm may lose economies of scale. State-owned firms may suffer from X-inefficiency. A good answer weighs the efficiency gain against these costs.

Checklist

- Asymmetric information: adverse selection before the contract (the used-car "lemons" market, insurance) and moral hazard after it; screening, signalling, regulation and contract design as responses, each with a limit (2.10).
- TR, AR and MR from a demand curve; for a straight-line demand curve MR is twice as steep; the $MR = MC$ rule and why it maximises profit.
- Abnormal profit, normal profit and losses from P against ATC; allocative efficiency ($P = MC$) and productive efficiency (lowest ATC).
- Perfect competition: characteristics, price-taker with $P = AR = MR$; short-run profit of 156 at $P = 36$; entry until $P = 24 =$ lowest ATC; efficient in the long run.
- Monopoly: barriers to entry; $Q_m = 40$, $P_m = 50$, ATC 42.5, profit 300; against competition at (60, 40), consumers lose 400 and the deadweight loss is 200; allocatively and productively inefficient, X-inefficiency; economies of scale and R&D as the case for size.
- Natural monopoly: AC still falling across market demand; unregulated (60, 40), $P = MC$ at (120, 10) with a loss of 1,000, $P = AC$ at (100, 20).
- Monopolistic competition: differentiation and non-price competition; short-run profit of 100; long run $P = ATC = 24.5$ at $q = 8$, above MC of 20, with excess capacity.
- Oligopoly: interdependence; the payoff matrix, dominant strategy and Nash equilibrium (12, 12) against collusion (20, 20); cartels, tacit collusion and price leadership, price wars and non-price competition; $CR4 = 90\%$ and its limits.
- Government responses: competition law and merger control, regulation, fines, nationalisation and trade liberalisation, and their costs.