Market Structure

Important Definitions

Perfect Competition = A market structure where there are many firms, none of which is large; where there is freedom of entry into the industry; where all firms produce an identical product; and where all firms are price takers.
Monopoly = A market structure where there is only one firm in the industry.
Oligopoly = A market structure where there are few enough firms to enable barriers to be erected against the entry of new firms.
Monopolistic Competition = A market structure where there are many firms and freedom of entry into the industry, but where each firm produces a and thus has some control over its price.
Barriers to Entry = Anything that prevents or impedes the entry of firms into an industry and thereby enables existing firms to have an advantage over potential new entrants.
Natural Monopoly = An industry where the market demand is large enough to support only one large firm operating efficiently.
Allocative Efficiency = Allocation of scarce resources that yields the right mix and quantity of goods and services to maximise society's welfare.
Productive Efficiency = A situation where firms are producing the maximum output for a given amount of inputs (macroeconomic) or producing a given output at the least cost (microeconomic).
Dynamic Efficiency = Innovation arising from investment of scarce resources into research and development.
Equity = A distribution of wealth, income and opportunities that is considered fair/just.

Characteristics determining Market Structure

1. No. of firms/sellers relative to market size
2. Extent of barriers to entry
3. Nature of products
4. Knowledge of product/market

	PC	MPC	Oligopoly	Monopoly
No. of firms	Large	Large	Few, dominant firms	One producer
Nature of products	Homogenous	Differentiated	Homogenous/ Differentiated	No close substitutes
Knowledg				

e	Perfect Info	Imperfect info	Imperfect info	Imperfect info
BTE	No BTE	No/Low BTE	High BTE	High BTE

Criteria for Assessing Performance/Desirability

1. Economic Efficiency
    - Allocative Efficiency
        - Maximise society's welfare
        - P=MC
            - Both consumer surplus and producer surplus maximised
            - No deadweight welfare loss
        - Assumptions
            - Society made up only of consumers and producers
            - No externalities and public goods
    - Productive Efficiency
        - Macroeconomic: Any point on the PPC
            - Resources used to the maximum capacity
            - No unemployment
            - No under-employment of resources
        - Microeconomic
            - Minimise wastage of resources
            - Society: MES
                - Firm's LRAC is at minimum
                - All IEOS have been exploited
            - Firm: Any point on LRAC curve (X-efficiency)
                - Lowest possible average cost for a given level of output
2. Dynamic Efficiency
    - Innovation from R&D
    - Improves level of technology
        - More and better quality output
        - New products
        - New production methods
    - Wider range, better quality and increased quantity of products
3. Equity/Distributive Efficiency
    - Fairness in distribution of wealth, income and opportunities
4. Consumer Choice
    - Freedom to choose from variety of goods and services
    - Freedom to purchase similar goods from different producers

<u>Why is MC=MR the profit maximising equilibrium?</u>

- Profit-maximising firm produces at output Q0 where MC=MR and charges price P0 which is the AR at output Q0

- P0 is the maximum price consumers are willing and able to pay for Q0 amount of goods
- When MC<MR, the firm should increase output to increase profits as the revenue gained from producing the next unit of the good is greater than the cost incurred from producing the next unit of the good
- When MC>MR, the firm should reduce output to increase profits as the cost incurred from producing the extra unit of good is greater than the revenue gained from producing the extra unit of good
- Hence, profit is only maximised at MC=MR

Why is P=MC the allocatively efficient output?

- P is the value society places on the last unit of the good produced
- MC is the opportunity cost to society for producing the last unit of the good
- When P>MC, society should increase output as the benefit gained from producing the next unit of the good is greater than the cost incurred from producing the next unit of the good
- When P<MC, society should decrease output as the cost incurred from producing the extra unit of the good is greater than the benefit derived from that extra unit of good
- Hence, only allocatively efficient when P=MC

Profit Maximising Equilibrium

- Conditions:
    1. MC=MR
        - Output level where ↑ in TR from sale of the last unit of output = ↑ in TC
        - When MR>MC, ↑ in TR > ↑ in TC, firm can ↑ profits by increasing output
        - When MR<MC, ↑ in TR < ↑ in TC, producing this last unit of output causes a fall in total profits, firm should reduce output
    2. MC is rising
        - When MC is falling, even if MR=MC, when output is increased, MR>MC, additional output produced will add more to TR than to TC
- SR Profits:
    - All firms can make supernormal, normal or subnormal profits in the short run
    - Diagram:
        - Price/Revenue/Cost vs Quantity
        - Origin
        - Position of AC curve in relation to AR curve
        - State TR, TC and profits/losses in terms of its area in the diagram

Adjustment Process to LR normal profits (PC/MPC):

- PC industry:

    - SR supernormal profits ⇒ New firms attracted to enter the industry since no BTE ⇒ ↑ no. of firms ⇒ ↑SS ⇒ ↓P + ↑Total Q ⇒ ↓AR=MR=DD curve for each individual firm ⇒ ↓Q for individual firms + Erosion of supernormal profits ⇒ Only LR normal profits
    - SR subnormal profits ⇒ Firms making subnormal profits will shut down and leave the market since no BTE ⇒ ↓ no. of firms ⇒ ↓SS ⇒ ↑P + ↓Total Q ⇒ ↑AR=MR=DD curve for each individual firm ⇒ ↑Q for each individual firm + ↓ losses of remaining firms ⇒ Only LR normal profits
- MPC industry:
    - SR supernormal profits ⇒ New firms attracted to enter the industry since no BTE ⇒ ↑ no. of firms ⇒ Assuming total market DD remains constant, ↓DD + ↑no. of close substitutes ⇒ ↓AR=DD and MR curves + ↑PED for each individual firm ⇒ At profit max level, ↓P + ↓Q for individual firms + Erosion of supernormal profits ⇒ Only LR normal profits
    - SR subnormal profits ⇒ Firms with TR<TVC will shut down and leave the market ⇒ ↓ no. of firms ⇒ Assuming total market DD remains constant, ↑DD + ↓no. of close substitutes ⇒ ↑AR=DD and MR curves + ↓PED for each individual firm ⇒ At profit max level, ↑P + ↑Q for each individual firm + ↓ losses of remaining firms ⇒ Only LR normal profits

Firm shut down condition:

- Cost if shut down = -TFC
- Cost if production continues = TR - TC
- Assuming profit-maximising/loss-minimising firm, firms will continue production as long as it incurs a smaller loss if it continues production than if it shuts down [i.e. -TFC > (TR-TC) ⇒ AR=P>AVC] in order to minimise its losses
- If P>AVC, the firm incurs a smaller loss if it continues production and hence, will continue production
- For PC firm, lack of BTE ⇒ TFC=0 ⇒ Firm will shut down if AR<AC

Perfect Competition

Characteristics:

- No BTE
    - ⇒ Large number of firms
    - ⇒ Only LR normal profits
    - Due to minimal fixed costs + perfectly mobile, uniformly priced FOP

- Large number of firms
    - ⇒ Each has insignificant market share
    - ⇒ Price-taker (i.e. no control over price)
- Homogenous products
    - Perfect substitutes to rivals' products
    - ⇒ No incentive to innovate
- Perfect knowledge
    - ⇒ No incentive to innovate as technology easily copied

Behaviour:

- Pricing
    - Firm is a price-taker (i.e. no control over price) ⇒ Perfectly price elastic demand ⇒ No incentive to reduce prices as can sell all at market price
        - Price determined by market demand and supply
    - Only LR normal profits
- Non-pricing
    - No incentive + ability to innovate due to
        - Lack of LR supernormal profits
        - Product homogeneity
        - Perfect info ⇒ Technology easily copied

Pros:

- Allocatively efficient
    - For firm, at profit maximising output level (MR=MC), P=MR=MC
    - For industry, equilibrium output where DD=SS ⇒ No deadweight welfare loss assuming no sources of market failure ⇒ Maximise society's welfare
- Productively efficient
    - For society, produces at MES
    - For firm, being a price taker, has to be as cost efficient as possible to maximise profits
        - If firm produces above LRAC, in LR, firm makes losses and will leave the industry
- Equitable
    - Profits spread among many small firms ⇒ Spread opportunity and wealth across the society
    - However, does not rectify existing inequity
- Desirability to consumers
    - Consumer surplus maximised since P=MC (Draw diagram - Area under DD curve)
    - ↓P assuming no significant iEOS
    - Consumer sovereignty (i.e. firms react to consumer demand more responsively)

Cons:

- Lack of dynamic efficiency
    - Due to:
        - No incentive to innovate as product homogeneity and perfect info makes new technology easily copied
        - No ability to innovate due to lack of LR supernormal profits
    - Static model, does not lead to technological progress
- No consumer choice
    - No variety of products due to homogenous products
- Unrealistic conditions for PC industry
- May not be so desirable if significant iEOS can be reaped for larger firms

Monopolistic Competition

Characteristics:

- No/Low BTE
    - ⇒ Large number of firms
    - ⇒ Only LR normal profits
    - Due to:
        - Low start-up/fixed costs
        - Perfectly mobile, uniformly priced FOP
        - Easily copied technology
- Large number of firms
    - ⇒ Each has insignificant market share
    - ⇒ Collusion not possible
- Differentiated products
    - ⇒ Price-setter (i.e. Downward sloping DD curve)
- Imperfect info
    - Some firms enjoy favourable locations
    - Some firms enjoy more efficient production methods

Examples:

- Blogshops
- F&B
- Small independently-run hotels

Behaviour:

- Pricing

    - Firm is a price-setter (i.e. Downward sloping DD curve)
    - Large number of close substitutes ⇒ Relatively price elastic demand ⇒ Firms should ↓P to ↑TR
    - Independent price-output policy (i.e. no price rigidity) ⇒ If firm decreases prices, loss in sales revenue will be spread over many rivals ⇒ Extent to which each rival firm suffers is negligible ⇒ Unlikely that rivals will engage in retaliation (i.e. no mutual interdependence)
    - Only LR normal profits
- Non-pricing
    - Engage in small scale product differentiation
        - Types:
            - Real physical differences through R&D
            - Imaginary differences through advertising/branding/marketing
            - Differences in conditions of sale (i.e. ambience/customer service)
        - Due to LR normal profits, can only engage in small scale product differentiation
        - Product differentiation ⇒ Maintain customer loyalty ⇒ ↑DD + ↑ Price inelasticity ⇒ ↑ price-setting ability ⇒ Able to restrict output to ↑P to ↑TR

Pros:

- Relatively small extent of allocative inefficiency (Extent of P>MC)
    - Due to relatively price elastic demand
    - ↓ Severity of under-allocation of resources
- X-efficient
    - Only LR normal profits ⇒ Must be X-efficient to maximise profits
        - If firm produces above LRAC, in LR, firm makes losses and will leave the industry
- Equitable
    - Profits spread among many small firms ⇒ Spread opportunity and wealth across the society
- Desirability to consumers
    - Relatively small extent of loss of consumer surplus/Less consumer exploitation
    - ↓P due to limited price setting ability (i.e. more price elastic demand) assuming no significant iEOS
        - Firms unable to collude due to large number of firms ⇒ Difficulty in coordinating
- Consumer choice
    - Consumer sovereignty (i.e. firms react to consumer demand more responsively)
    - Choice of producer
    - Choice of variety of products
- Dynamic efficiency
    - Incentive to engage in product differentiation in order to increase demand and make demand more price inelastic

Cons:

- Relatively larger extent of productive inefficiency from society's POV (Produces further from MES due to smaller scale of production)
    - Always productively inefficient due to excess capacity theorem
        - Attempts at product differentiation results in firms producing at higher AC than MES
- Limited scale of dynamic efficiency
    - Limited ability to innovate due to lack of LR supernormal profits ⇒ Unable to engage in more sophisticated ways to improve on quality of products
    - Less incentive to engage in substantial R&D as technology easily copied and lack of LR supernormal profits to do so
- May not be so desirable if significant iEOS can be reaped for larger firms

Oligopoly

Characteristics:

- High BTE
    - Types:
        - Natural
            - High overhead/sunk/fixed costs ⇒ Large MES ⇒ Larger firms can reap substantial iEOS ⇒ Difficult for new players to compete with larger existing firms
            - Small market size - e.g. Singapore/Specialised industries such as space travel
        - Artificial
            - Legal barriers - e.g. Copyrights, Patents, Market Franchises
            - Brand loyalty
            - Vertical integration - Control over essential raw materials
    - ⇒ Few large firms dominating the industry
    - ⇒ Firms able to enjoy substantial iEOS
    - ⇒ Able to retain LR supernormal profits
- Few, dominant firms
    - ⇒ Each firm has significant proportion of market share
    - ⇒ Mutual interdependence (i.e. Actions by any single firm will affect all other firms significantly)
    - ⇒ High price setting ability although limited by mutual interdependence
- Homogenous/Differentiated products
    - Homogenous products - e.g. Petroleum ⇒ Pure/Perfect oligopoly
        - Theoretically only one price
    - Differentiated products - e.g. Smartphone industry ⇒ Imperfect oligopoly

        - Changes in price may be perceived to be due to modification to the good
- Imperfect info
    - Imperfect info on production methods ⇒ BTE for potential firms

Examples:

- OPEC (Organisation of Petroleum Exporting Countries)
- Airlines Industry
- Global Pharmaceutical Firms
- Singapore - Taxi industry, Telcos

Behaviour:
Competitive Oligopoly

- Pricing Behaviour
    1. Price rigidity due to mutual interdependence (see below)
        - However, does not explain how equilibrium price is determined
    2. Predatory Pricing/Price Wars
        - Larger firms that enjoy significant iEOS and hence have lower AC can sell goods at a much lower price than smaller firms ⇒ Smaller/Potential firms unable to match the lower price while making a profit and hence may shut down ⇒ Smaller firms driven out of the market ⇒ Remaining large firms able to gain larger market share in LR ⇒ ↑DD + ↓PED ⇒ ↑ profits in LR
    - Able to retain LR supernormal profits due to high BTE (artificial/natural)
- Non-pricing Behaviour
    1. Product differentiation
        - Types:
            - Real physical differences through R&D
            - Imaginary differences through advertising/branding/marketing
            - Differences in conditions of sale (i.e. ambience/customer service)
        - Due to LR supernormal profits, able to engage in larger scale product differentiation than MPC firms
        - Product differentiation ⇒ Maintain customer loyalty ⇒ ↑DD + ↑ Price inelasticity ⇒ ↑ price-setting ability ⇒ Able to restrict output to ↑P to ↑TR
    2. Merger/Acquisition
        - ↑ Size ⇒ Able to reap ↑iEOS ⇒ ↓AC ⇒ ↑Profits assuming TR remains constant
        - Horizontal Integration
            - ↓ no. of firms in the industry + ↑ market share of firm ⇒ ↑DD + ↓PED ⇒ ↑ price-setting ability ⇒ Able to increase total revenue and profits by raising prices
    3. R&D
        - ↑ Quality of products (product differentiation)

        - Improve efficiency of production process ⇒ ↓AC ⇒ ↑ Profits assuming TR remains constant
    - Firms in competitive oligopoly more likely to adopt non-pricing strategies due to price rigidity restricting the effectiveness of pricing strategies

Cooperative Oligopoly (Mostly for perfect oligopolies - i.e. homogenous products)

- Pricing Behaviour
    - How it works:
        - Firms in the industry act like a monopoly and set price at profit maximising level of entire industry
        - ↑P + ↓ Unpredictability of rivals' reactions + ↓ expenditure on excessive advertising ⇒ ↑ Profits of group as a whole
    - Types:
        1. Formal Collusion/Cartels - e.g. OPEC
            - Members collude to set fixed price by restricting total industry output
            - Each firm given production quota
            - Alternatively, members divide the market between themselves - e.g. Pest Control Companies in Singapore (divide by location)
        2. Tacit Collusion/Price Leadership - e.g. Petrol retail industry by Shell
            - Price set by market leader who selects the price-output combination which will maximise its own profits
            - When market leader initiates a change in prices, other firms will follow its lead
        3. Vertical Collusion - e.g. Apple colluding with book producers
            - Colluding with firms at different levels of the supply chain such as to only supply certain raw materials/factors of production to a certain firm ⇒ ↑BTE for firms higher up the supply chain as potential firms unable to source for factors of production + ↑ Profits for firms further down the supply chain as higher prices offered for factors of production
        - Incentive to cheat secretly ⇒ Fragile relationship
            - Price-output combination may not necessarily maximise the profits of the individual firms
            - Firms may choose to increase output beyond their quota ⇒ ↑SS ⇒ ↓P if significant enough ⇒ Collapse of collusive agreement
            - Firms may poach the markets of others

<u>Price Rigidity (Draw kinked DD curve)</u>

- If firm raises prices above equilibrium price, rivals are unlikely to follow ⇒ DD relatively price elastic ⇒ ↑P leads to more than proportionate ↓Qd ⇒ ↓TR

- If firm reduces prices below equilibrium price, rivals are likely to follow ⇒ DD relatively price inelastic ⇒ ↓P leads to less than proportionate ↑Qd ⇒ ↓TR
- Thus, firm perceives that it does not benefit from any attempt to raise/reduce prices ⇒ Kinked DD/AR curve + Disjointed MR curve ⇒ As long as change in MC is within disjointed region of MR curve, price-output combination will remain unchanged
- Prices may change only if cost conditions change significantly

Pros

- Relatively smaller extent of productive efficiency from society's POV
    - Usually produces nearer MES due to larger scale of production ⇒ Able to reap significant iEOS
    - Can possibly produce at MES if by coincidence
- Possibly lower prices for consumers
    - If larger firms are able to reap significant iEOS
        - However, depends on willingness of firm to pass on cost-savings to consumer
    - If firms engage in price wars
        - However, usually only short-lived
- Dynamic efficiency
    - Incentive to innovate due to high competition between dominant firms in order to reduce fear of rivals' actions
    - Incentive to engage in R&D to reduce cost of production/increase quality of products to earn greater supernormal profits
    - Ability to innovate due to LR supernormal profits
    - However, collusive oligopoly/homogenous products may lead to slow pace of innovation
    - 'Creative Destruction'
        - Supernormal profits attracts new entrants producing new and competing products with new and innovative ideas ⇒ Δ in level of technology
        - Entry barriers not a serious problem when level of technology changes
        - Supernormal profits pushes for progress and long run expansion of total societal output

Cons

- Relatively larger extent of allocative inefficiency
    - Due to relatively price inelastic demand
    - ↑ Severity of under allocation of resources
    - Misallocation of resources due to large scale advertising
    - Wasteful duplication e.g. 2 competing stations both screening the World Cup
- Possibly X-inefficient
    - Able to retain supernormal profits in LR ⇒ Room for firm to be X-inefficient and

still make supernormal profits
    - ↓ Competitive pressure on profit margins
    - Firms may become complacent and cost controls may become lax due to overstaffing and overspending on prestige (e.g. Facebook regional HQ in Singapore)
    - However, firms may be forced to X-efficient due to contestable markets (e.g. Globalisation ⇒ Growth in international competition)
- Exacerbates inequity
    - LR supernormal profits concentrated in the hands of a few producers at the expense of a few consumers who are charged higher prices
    - Consumers suffer more due to exploitative pricing by oligopolistic firms
- Usually higher prices
    - Due to price inelastic demand and increased price-setting ability
    - Price rigidity ⇒ Small reductions in cost of production not passed on to consumers ⇒ Prices usually remain static and high
    - Collusion ⇒ Exacerbates degree of consumer exploitation and allocative inefficiency
- Limited consumer choice compared to MPC
    - High BTE ⇒ Fewer choices
    - Firms sometimes package similar products under different brand names ⇒ Illusion of choice
    - No choice if homogenous products

Evaluation of oligopoly vs MPC

- Very often, nature of the industry decides the market structure of the industry
    - Oligopoly
        - Industries that require huge capital outlays/sunk costs - e.g. Telcos
            - Larger firms able to reap substantial iEOS to reduce AC ⇒ ↓P for consumers + ↑profits for firms
        - Industries that have significant room for R&D - e.g. Pharmaceuticals/Smartphone
            - High costs of R&D able to be spread over larger level of output
            - Incumbent firms already have LR supernormal profits ⇒ ↑ ability to engage in R&D
            - ↑R&D ⇒ ↑ product quality + ↓ cost of production ⇒ ↑BTE as technology often not easily copied by potential new firms
    - MPC
        - Industries with low start-up costs
            - Low BTE ⇒ iEOS quickly exhausted at low levels of output ⇒ MES at low output level ⇒ ↓ advantage of large firms
        - Industries where more personalised services/localised demand are desired by consumers - e.g. F&B

- MPC more desirable in terms of allocative efficiency and X-efficiency
- Oligopoly more desirable in terms of productive efficiency from society's POV and dynamic efficiency
- MPC more desirable in terms of consumer welfare now, however, increased dynamic efficiency of oligopoly is important in the LR in order to raise consumer welfare in the future

Monopoly

Characteristics:

- High BTE
    - Types:
        - Natural
            - High overhead/sunk/fixed costs ⇒ Large MES ⇒ Larger firms can reap substantial iEOS ⇒ Difficult for new players to compete with larger existing firms
            - Small market size - e.g. Singapore/Specialised industries such as space travel
        - Artificial
            - Legal barriers - e.g. Copyrights, Patents, Market Franchises
            - Brand loyalty
            - Vertical integration - Control over essential raw materials
    - ⇒ Firms able to enjoy substantial iEOS
    - ⇒ Able to retain LR supernormal profits
- Single Firm
    - ⇒ Firm DD curve = Industry DD curve
    - ⇒ High price setting ability although limited by mutual interdependence
- No close substitutes
    - ⇒ Highly price inelastic and cross inelastic demand
    - ⇒ Able to practise price discrimination
- Imperfect info
    - Imperfect info on production methods ⇒ BTE for potential firms

Natural monopolies = A market where market demand is large enough to support only one large firm operating efficiently

- Substantial IEOS due to huge capital outlay/TFC ⇒ As output increases, TFC spread out over a larger output ⇒ ATC falls ⇒ Large MES relative to market demand ⇒ Market demand can only support 1 firm
- Potential new entrants discouraged from entering due to high initial fixed cost ⇒ High BTE

Examples:

- Blogshops
- F&B
- Small independently-run hotels

Behaviour:

- Pricing
  - Firm is a price-setter (i.e. Downward sloping DD curve)
  - No close substitutes ⇒ Highly price inelastic and cross inelastic demand ⇒ Firms can restrict output to ↑P and ↑TR
  - No close substitutes ⇒ Able to price discriminate
  - Able to retain LR supernormal profits due to high BTE and ability to erect artificial BTE to maintain its position
- Non-pricing
  - Ability to innovate due to LR supernormal profits
  - Little incentive to innovate due to lack of competition + new technology might reduce profits earned from current products

Pros

- Relatively smaller extent of productive efficiency from society's POV
  - May produce nearer MES due to larger scale of production ⇒ Able to reap significant iEOS
  - Can possibly produce at MES if by coincidence
- Possibly lower prices for consumers
  - If larger firms are able to reap significant iEOS
    - However, depends on willingness of firm to pass on cost-savings to consumer
- Ability to innovate due to LR supernormal profits
  - Possibly forced to engage in R&D in order to survive due to 'Creative Destruction'
    - Supernormal profits attracts new entrants producing new and competing products with new and innovative ideas ⇒ Δ in level of technology
    - Entry barriers not a serious problem when level of technology changes
    - Supernormal profits pushes for progress and long run expansion of total societal output
  - Due to Theory of Contestable Markets
    - Failure of monopoly to price efficiently, be cost efficient or engage in suitable levels of R&D may turn potential competition into real competition

Cons

- Allocatively inefficient
  - Due to very price inelastic demand
  - ↑ Severity of under allocation of resources
- Possibly X-inefficient
  - Able to retain supernormal profits in LR ⇒ Room for firm to be X-inefficient and still make supernormal profits
  - ↓ Competitive pressure on profit margins
  - Firms may become complacent and cost controls may become lax due to overstaffing and overspending on prestige (e.g. Facebook regional HQ in Singapore)
  - However, firms may be forced to X-efficient due to contestable markets (e.g. Globalisation ⇒ Growth in international competition)
- Exacerbates inequity
  - LR supernormal profits concentrated in the hands of a few monopolies at the expense of a few consumers who are charged higher prices
  - Consumers suffer more due to exploitative pricing by monopolies
- Usually higher prices
  - Due to price inelastic demand and increased price-setting ability
- No consumer choice compared to MPC
  - No choice in product variety
  - No choice in producer
  - Restricted consumer sovereignty
- Slow pace of innovation
  - Lack of competition + Huge BTE ⇒ Secure dominant position of monopolist ⇒ Less incentive to innovate ⇒ Slow pace of innovation