Market Structure Cheat Sheet

Important Definitions

PC = 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.
MPC = 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.
BTE = 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.
Price Discrimination = When a firm sells the same product at different prices not arising from differences in production cost.

Criteria for Assessing Performance/Desirability

1. Allocative Efficiency
    - P=MC
    - Assumptions
        - Society made up only of consumers and producers
        - No externalities and public goods
2. Productive Efficiency
    - Macroeconomic: Resources used to the maximum capacity (Any point on PPC)
    - Microeconomic
        - Society: Firm operating at MES
        - Firm: Firm operating at any point on LRAC curve (X-efficiency)
3. Dynamic Efficiency
    - Innovation from R&D
4. Equity (Distributive Efficiency)
    - Fairness in distribution of wealth, income and opportunities
5. Consumer Choice
    - Freedom to choose from variety of goods and services
    - Freedom to purchase similar goods from different producers

Why is MC=MR the profit maximising equilibrium?

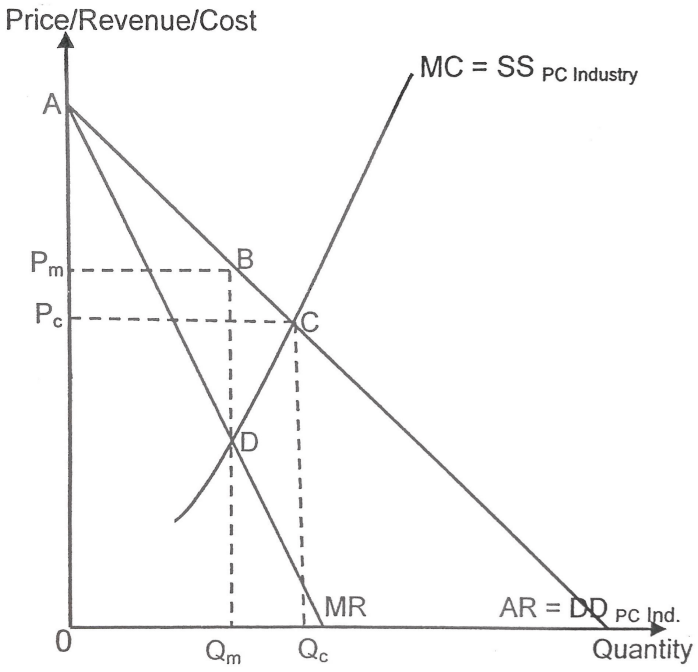
- Profit-maximising firm produces at output Q0 where MC=MR and charges price P0 which is the AR at output Q0
- P0 is the maximum price consumers are willing and able to pay for Q0 amount of goods
- When MC<MR, the firm should increase output to increase profits as the revenue gained from producing the 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
- 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
- Hence, only allocatively efficient when P=MC

Comparing PC Industry with Monopoly Firm

Figure 27a



- Assume DD and cost conditions are the same in both PC industry and monopoly firm
- Allocative Inefficiency
    - In PC industry, all firms are price takers ⇒ Eqm P and output of each firm is determined by market DD and SS ⇒ PC industry produces at price P_C and output Q_C where $SS_{PC}=DD_{PC}$ ⇒ In the absence of market failure, this is the allocatively efficient level of output where $P_C=SS_{PC}=MC$ ⇒ Value that society places on the consumption of the last unit of the good is equal to the opportunity cost of producing it
    - Allocatively efficient level of output occurs when P=MC (insert why)
    - In a monopoly firm, the firm is a price setter ⇒ Profit-maximising monopoly firm restricts output to set high prices and earn higher profits ⇒ Profit maximising monopoly firm will produce at profit maximising output where MR=MC at price P_m and output Q_m ⇒ Lower output and higher prices than allocatively efficient output level ⇒ {Under-production of the good by QmQc ⇒ DWL of area BCD ⇒ Allocatively inefficient as for each unit under-produced, the benefit to society from consuming the additional unit (represented by P) is greater than the opportunity cost to society of producing it (represented by MC)} + ↓CS
- Productive Inefficiency
    - In the LR, firm in PC industry would achieve X-efficiency → Being a price taker, firm has to be as cost-efficient as possible in order to maximise profits ⇒ {No BTE in PC industry ⇒ New firms can freely enter the industry with little startup costs ⇒ If there are short term supernormal profits to be made in the industry, new firms will enter the industry ⇒ ↑SS ⇒ ↓ Eqm market price ⇒ In the LR, only normal profits to be made} ⇒ Firms have to operate

on LRAC curve as any point above the LRAC would result in losses for the firm ⇒ Leave the industry in the LR
    - Monopoly firm able to retain LR supernormal profits due to high BTE ⇒ May become complacent and lax in terms of cost control as the monopoly firm can afford to be X-inefficient and still be able to make some supernormal profits
        - Rebuttal: Removal of protectionist barriers as a result of globalisation means that there is increased international competition ⇒ Theory of contestable markets → If monopoly firm is inefficient, foreign firm may enter the market and compete with the monopoly firm ⇒ Monopoly firm may be forced to be X-efficient to survive
- Inequity
    - PC market
        - Spreads opportunities and wealth widely and more evenly among many small firms due to no BTE
        - CS maximised ⇒ Consumers not exploited by firms
    - Monopoly
        - Exacerbates inequity as LR supernormal profits concentrated in the hands of a few monopolies which have the ability to block potential new entrants
        - ↓ CS ⇒ Consumers exploited by the large monopoly firms as they have to pay higher prices for a limited quantity of goods

Barriers to Entry

- Substatial iEOS to be reaped → High fixed costs
- Control over essential raw materials
- Legal barriers
- Brand loyalty

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

Perfect Competition

- Characteristics
    1. Large number of firms
        - Each firm has insignificant market share
        - Due to no BTE
    2. Homogenous products
    3. No BTE
        - Due to minimal fixed costs and perfectly mobile, uniformly priced factors of production
    4. Perfect knowledge
        - Firms know prices, costs, profits and technology of rivals
        - Consumers know each and every seller's price, quality and availability of products
- Behaviour
    - Firm is a price-taker
        - Due to insignificant market share and homogeneity of products sold
        - No incentive to reduce prices as firm can sell off its products at prevailing price
        - Consumers would switch to rival firm if firm raises prices
    - No incentive/ability to innovate
        - Product homogeneity assumption
        - Perfect information means that new technology is easily copied
        - Only LR normal profits means that the firm does not have the ability to innovate
    - Only LR normal profits
        - Due to no BTE
- Adjustment process from SR profits to LR normal profits
    - SR supernormal profits
        1. Due to possible SR supernormal profits to be made in the industry and no barriers to entry, new firms are attracted to enter the industry
        2. As the total number of firms ↑, the total output in the industry ↑
        3. Market SS ↑, P ↓, ceteris paribus
        4. Since PC firms are price-takers, they sell at new equilibrium market price
        5. As price ↓, supernormal profits of firms get eroded until only normal profits can be made
        6. Although total market output ↑, each individual firm's output ↓ since they would produce at profit maximising level MC=MR
    - SR subnormal profits
        1. Due to each firm in the industry making losses in the SR and no barriers to exit, firms with TR<TVC will be forced to shut down and leave the market
        2. As the total number of firms ↓, the total output in the industry ↓

3. Market SS ↓, P ↑, ceteris paribus
4. Since PC firms are price-takers, they sell at new equilibrium market price
5. As price ↑, losses of firms get reduced until firms make normal profits

- Desirability
  - Advantages
    - Allocatively efficient
    - Productively efficient from society's and firm's POV
    - Achieves equity
      - Profits and opportunities spread among small firms
      - Consumer surplus maximised
      - But does not rectify existing inequity
    - Consumer choice in terms of different producers
    - Consumer sovereignty
      - Firms react to consumer demand responsively
  - Disadvantages
    - No dynamic efficiency
      - Perfect information ⇒ Innovations are quickly replicated by rival and new firms
      - LR normal profits ⇒ Lack ability to conduct R&D
      - Assumption of homogenous products make innovation irrelevant
    - No consumer choice in terms of product variety due to homogenous products
    - May not provide optimum allocation of resources due to market failure
    - Assumptions unrealistic ⇒ Highly unlikely to be found in the real world

Monopoly

- Characteristics
  1. Single producer
     - Firm DD curve=Industry DD curve
  2. No close substitutes
     - Price inelastic demand
     - Cross inelastic demand
  3. High BTE
     - Natural monopoly
       - Huge overhead costs/TFC incurred ⇒ AFC and hence ATC falls continually over a very large output ⇒ Large MES
       - Large minimum efficient scale relative to market DD + Substantial iEOS to be reaped ⇒ New firms begin operation on a smaller scale ⇒ Higher unit cost of production ⇒ Unable to compete effectively with incumbent firms
     - Artificial BTE
       - Strategic entry deterrence → Product differentiation to induce/maintain customer loyalty via advertising or R&D OR Engage

in price war to force new firms to exit the market
        - Legal barriers (e.g. patents, copyrights, licenses)
        - Ownership of essential raw materials ⇒ Denies access of these inputs to potential rivals
        - Mergers, collusions, takeovers to ↓ level of competition in the industry
    4. Imperfect knowledge
- Behaviour
    - Great price setting ability
        - Due to being the only producer, no close substitutes and imperfect knowledge
    - Able to price discriminate
        - Due to no close substitutes
    - Able to retain LR supernormal profits (does not necessarily earn supernormal profits)
        - Due to high BTE
    - Ability to invest in R&D
        - Due to LR supernormal profits
        - However, may be unwilling to engage in R&D
            - Due to lack of competition and hence, new technology might reduce profits earned from current products
- Desirability
    - Advantages
        - Beneficial if monopoly is able to reap substantial IEOS ⇒ ↓AC and MC compared to PC industry ⇒ Possibly lead to ↓P and ↑Q ⇒ ↑CS
            - But still allocatively inefficient
        - Ability to conduct R&D
    - Disadvantages
        - Allocatively inefficient
        - Productively inefficient from society's POV
        - Can be X-inefficient
            - Firm may be complacent as it can still earn some supernormal profits
            - Anti-thesis:
                - Removal of protectionist barriers as a result of globalisation means that there is increased international competition ⇒ Theory of contestable markets → If monopoly firm is inefficient, potential competition could turn into actual competition and foreign firm may enter the market to compete with the monopoly firm ⇒ Threat of entry of new firms forces monopoly firm to be X-efficient to survive
                - e.g. Open skies policy has led to deregulation of certain routes in the airline industry that were previously dominated by a few large firms
        - Exacerbates inequity
            - Supernormal profits concentrated with a few firms

        - Loss of consumer surplus
            - Anti-thesis:
                - If monopolist can reap significant EOS, may not necessarily result in loss of consumer surplus
    - Reduced pace of innovation as monopoly firms may be unwilling to engage in R&D
        - Due to lack of competition and hence, new technology might reduce profits earned from current products
        - Anti-thesis: Creative destruction
            - Large LR supernormal profits attracts new entrants producing new and competing products
            - Entry barriers can be broken down when level of technology changes ⇒ Incentivises new firms to innovate and raise level of technology
    - No consumer choice

Oligopoly

- Characteristics
    1. Few dominant firms relative to market size
        - Few firms command large proportion of market share
        - Market concentration ratio
    2. Homogenous/differentiated products
    3. High BTE
    4. Imperfect knowledge
- Behaviour
    - Limited price setting ability
        - Due to mutual interdependence
    - Able to retain LR supernormal profits (does not necessarily earn supernormal profits)
        - Due to high BTE
    - Able to invest in R&D
        - Due to LR supernormal profits
    - Mutual interdependence
        - Due to a few dominant firms and cross elastic demand between rivals
- Competitive Oligopoly
    - Pricing behaviour
        - Price Rigidity
            1. Due to mutual interdependence, firms have to predict rivals' reactions to its pricing strategies
            2. If firm raises prices above equilibrium price, rivals are unlikely to follow
                - DD relatively price elastic
                - ↑ P leads to more than proportionate ↓ Qd
                - Thus, ↓ TR
            3. If firm reduces prices below equilibrium price, rivals are likely to

follow
        - DD relatively price inelastic
        - ↓ P leads to less than proportionate ↑ Qd
        - Thus, ↓ TR
    4. Firm perceives that it does not benefit from any attempt to raise/reduce prices
    5. Kinked DD (AR) curve ⇒ Disjointed MR curve
        - If change in MC is within disjointed region of MR curve, price-output combination will remain unchanged
- Price wars/Predatory pricing
    - One firm sets prices below rivals' LRAC curve to drive rivals out of the industry and capture their market share
    - Results in lower profits for all firms in SR but would result in larger LR supernormal profits if the firm is successful
        - Not sustainable and are usually sporadic
- Non-pricing behaviour
    - Product differentiation
        - ↑ Price inelasticity of demand and ↑ DD
        - ↓ Fear of rivals' actions
        - Types
            - Real differences (R&D/Innovation)
            - Imaginary differences (Advertising)
                - Builds customer loyalty to ↑ price inelasticity of demand
            - Differences in conditions of sale
    - Improvements in level of technology
        - ↓ AC
    - Oligopolists in competitive oligopoly likely to employ non-pricing strategies due to price rigidity and to maintain high BTE
- Collusive Oligopoly
    - Cartels (Formal collusion)
        - e.g. Organisation of Petroleum Exporting Countries (OPEC)
        - Members formally collude to set high fixed price by restricting total industry output hence, maximising joint profits
        - Anti-thesis
            - Although high price set maximises joint profits, it does not necessarily maximise each individual firms' profits
            - Members will have incentive to cheat by poaching other's markets or increasing output beyond its quota in order to increase their profits
            - If output is raised enough to cause a significant rise in market supply, prices would fall, resulting in a collapse of collusive agreement
    - Price Leadership (Tacit collusion)
        - Market leader chooses price-output combination which will maximise its profits
        - Smaller firms will follow the price set by the market leader

    - Makes oligopoly act like a monopoly
- Desirability
    - Allocatively inefficient
        - Wasteful duplication
            - e.g. 80% want to watch World Cup finals, 20% prefer to watch opera ⇒ If there were 2 competing channels, both stations would screen the football game; But if there was a 2 channel monopoly, the match could be screened on one channel and the opera on the other.
        - Misallocation of resources due to large scale advertising which could be used to produce more goods
    - Productively inefficient
    - Exacerbates inequity → Esp through collusion/price discrimination
    - Ability to conduct R&D
    - Encourages innovation and R&D
        - But pace of innovation may be slow in collusive or entrenched oligopolies
    - Consumer choice in terms of product variety and producer
        - Anti-thesis
            - Firms may package similar products under different brand names (Brand proliferation)
            - Firms likely to engage in extensive advertising to induce customer loyalty

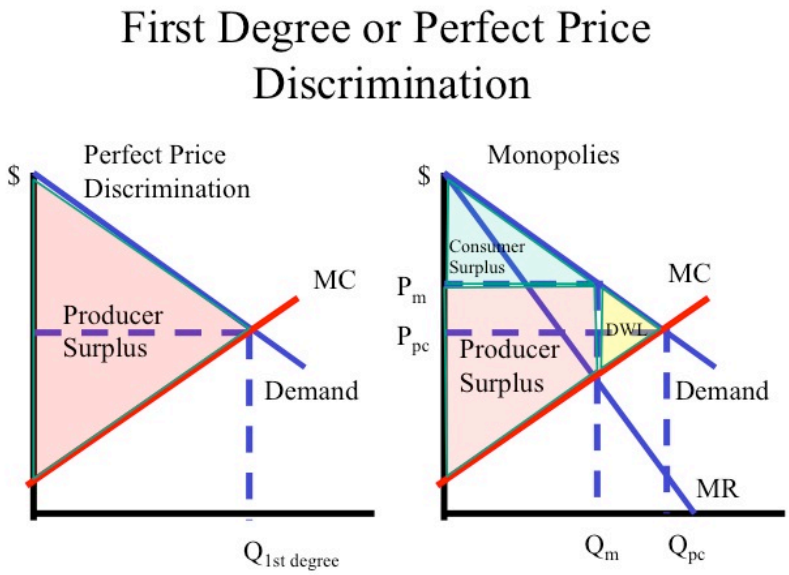
Monopolistic Competition

- Characteristics
    1. Large number of firms
        - Due to low BTE
        - Each firm has insignificant market share
    2. Differentiated products
    3. No/Low BTE
        - Due to low start-up costs, mobile factors of production and easily-copied technology
    4. Imperfect knowledge
- Behaviour
    - Firm is a price-setter
        - Due to differentiated products and imperfect knowledge
    - Relatively price elastic demand
        - Due to large number of close substitutes
    - Collusion not possible
        - Due to large number of firms
    - No mutual interdependence
        - Due to large number of firms resulting in the extent to which rivals suffer from the pricing strategies of a firm being negligible
    - Only LR normal profits
        - Due to no/low BTE

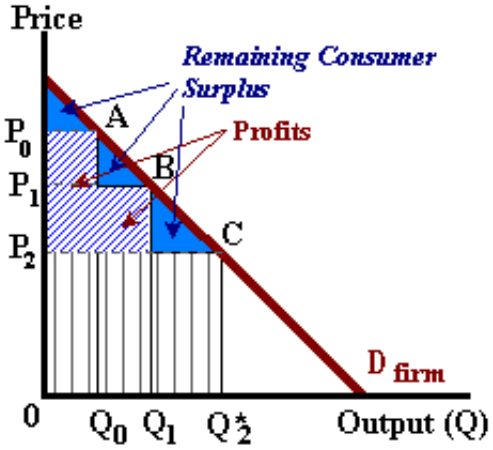
        - Limited ability to engage in non-pricing strategies
            - Due to only LR normal profits
- Pricing strategies
    - Firms should ↓ P to ↑ TR
        - Due to relatively price elastic demand
    - Firms able to practise independent price-output strategies
        - Due to no mutual interdependence
- Non-pricing behaviour
    - Product differentiation
    - Same as oligopoly but to a smaller extent
        - Due to only LR normal profits
- Adjustment process from SR profits to LR normal profits
    - SR supernormal profits
        1. Due to possible SR supernormal profits to be made in the industry and no/low barriers to entry, new firms are attracted to enter the industry
        2. As the total number of firms ↑, ↓ DD for each firm assuming total market demand remains constant and ↑ price elasticity due to more close substitutes
        3. At profit maximising level, equilibrium price and output ↓
        4. Profits decrease until each firm only makes normal profits (AR=AC)
    - SR subnormal profits
        1. Due to each firm in the industry making losses in the SR and no barriers to exit, firms with TR<TVC will be forced to shut down and leave the market
        2. As the total number of firms ↓, ↑ DD for each firm assuming total market demand remains constant and ↓ price elasticity due to fewer close substitutes
        3. At profit maximising level, equilibrium price and output ↑
        4. Profits increase until each firm is able to make normal profits (AR=AC)
- Desirability
    - Allocatively inefficient
        - Smaller extent than oligopoly and monopoly
    - Productively inefficient from society's POV
        - Excess capacity theorem
            - Product differentiation results in higher AC
    - X-efficient
        - Due to only LR normal profits
    - Equity
        - Spreads opportunities and wealth across society
        - Small extent of loss of consumer surplus
    - Incentive to innovate
    - Limited ability to innovate
        - Only able to do so on a small scale
    - Consumer choice in terms of variety of products, producers and consumer sovereignty

Price Discrimination

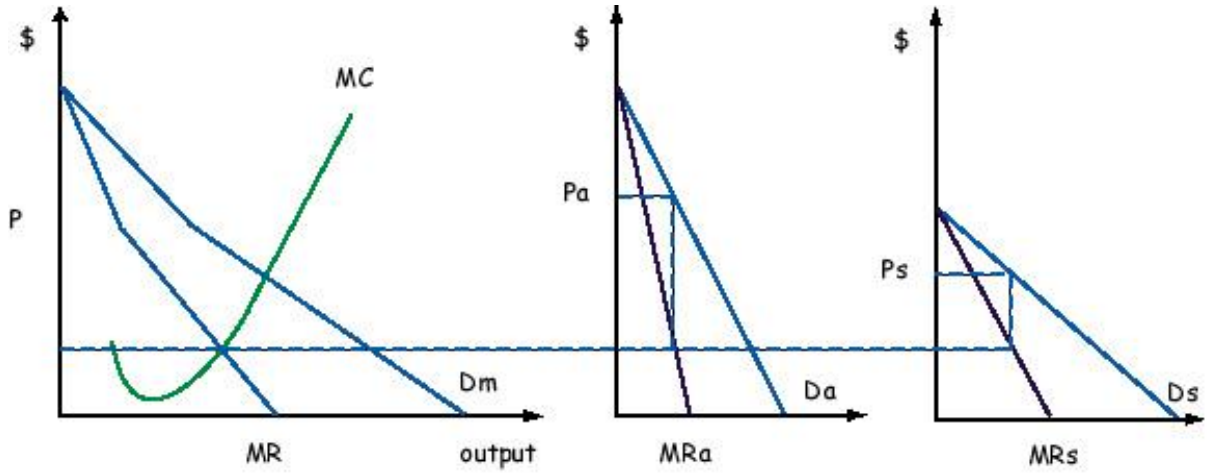
- Criteria for price discrimination to be possible:
    1. Firm must have control over market supply
    2. Resale can be prevented
    3. Firm must be able to segment the market into sub-markets based on willingness to pay and PED
- 1st Degree Price Discrimination (Perfect Price Discrimination)
    - Firm able to capture all of the consumer surplus
    - DD curve becomes new MR curve, AR curve increases
    - Achieves allocative efficiency
    - Difficulties:
        1. Impractical to charge each and every customer a different price for each and every unit
        2. Customers will not usually reveal the maximum price that he is willing to pay for each unit of the good
    - e.g. Auction/Markets



- 2nd Degree Price Discrimination (Block Pricing)
    - The greater the amount consumed, the lower the per unit price of the good
    - Same price structure applied to every consumer
    - Price varies by blocks of units purchased
    - e.g. In some countries, electricity companies charge a higher price for the first few kilowatts (relatively price inelastic as it is used to power necessities)



- 3rd Degree Price Discrimination
  - Relative prices based on differing PED values → Higher prices charged for relatively price inelastic sub-market
    - Overall MR curve is a horizontal summation of the MR curves in the 2 sub-markets
    - Profit maximising output at output where overall MR = MC ⇒ Produce at marginal cost of production at this output level in both sub-markets ⇒ Price and output combination at level where MR in each sub-market = MC where overall MR=MC
  - Example: Peak Load Pricing
    - Prices during peak periods are higher than prices during off-peak periods
    - During peak periods, demand is less price elastic => higher prices
    - Anti-thesis:
      - Higher charges may be due to higher marginal costs during peak times
        - Fixed factors means that marginal cost rises as output expands
        - Diminishing returns to variable factors
        - Using additional equipment at higher operating costs
        - e.g. Opening more counters/Hiring extra staff



- Advantages
  - Higher output
  - Higher profits may facilitate ability to conduct R&D
    - However, firms may not have the incentive to conduct R&D
  - Consumers from lower income groups able to consume a good/service they would otherwise not be able to afford
  - Provision of goods that would otherwise not be produced
    - In industries where AC curve is higher than Dd curve, good would not be produced if the firm charges a uniform price for all units of the good sold
    - However, with first degree price discrimination, total revenue can possibly increase to a point where TR > TC
  - For first degree price discrimination, allocatively efficient
- Disadvantages
  - Loss of Consumer Surplus
    - However, no deadweight welfare loss
  - Allocatively inefficient (Other than first degree price discrimination)
    - Monopoly restricts output to set high price
    - Under-production of the good => Deadweight welfare loss