

Size of Firms and Industrial Concentration

Measurement of Size of Firms		
Factor	Small firms	Big Firms
Legal Formation	One director	Multiple directors
Number of Shareholders	Family and friends	Hundreds/ thousands
Size of Capital Assets	Less than S\$2 million	Billions
Number of Employees	Less than 50	Thousands
Sales Revenue	Less than S\$100 million	Billions
Market Share	Less than 10%	More than 25%
Measurement of Industrial Concentration		
Factor	Less Concentrated Industries	More Concentrated Industries
Concentration ratio ¹	Less than 10%	More than 25%

Determinants of Size of Firms

Demand Factors:

Limited Market Size

While there may be huge average cost savings to be reaped from expansion, expansion will not be economically efficient if the size of demand for the product is small. This is because with a small demand, the profit-maximising level of output, when marginal revenue (MR) is equal to marginal cost (MC) is also small, at Q0. As such, there is a lack of incentive for the firm to increase the scale of its production because despite average costs falling from C0 to C1 when output increases from Q0 to Q1, average revenue (AR) falls even more from R0 to R1. Hence, the firm may incur lower profits, or even subnormal profits should it decide to increase its scale of production, so the profit-maximising firm would not increase its scale of production.

¹ The most commonly used concentration ratios measure the dominance of the 3, 5, or 7 largest firms, which examines the market share of the top 3, 5, or 7 largest firms in the defined industry. For example, if we are using employment as the measuring rod and the number employed by the 3 largest firms in the industry is 1 million while the total employment in the industry is 4 million, the three-firm employment concentration ratio is 25%.

Consumer Preference for Specialised Products or Services

Expansion may also not be economically efficient if large scale production derives average cost savings from product standardisation, where mass produced goods lacking in individuality are churned out. Consumers demand a wide variety of styles, patterns, and designs in certain markets that are not available from larger firms. For example, firms in the markets for hand-sewn shoes, customised clothing or jewellery may be very small indeed but these small firms tend to cater well for niche markets. Hence, a smaller firm usually succeeds in satisfying the demand for a non-standardised product in these niche markets as it is in close contact with its customers, facilitating the communication of special requests. Such personalised services enable small firms to gain greater customer loyalty, allowing them to enjoy a relatively more price-inelastic demand so they can increase the price of their product without losing significant market share, thus increasing its revenue and profits. Hence, firms providing such services are likely to be small in size as they need to provide individual attention to their customers/ clients, while larger firms are less likely to be able to maintain that personal touch.

Subcontracting Relationships

Small firms may also exist as they serve as auxiliary firms to support large firms via subcontracting. Small firms manufacture parts and components that are used by large firms in the making of the final product for sale. For example, the transportation machinery industry, which includes car making, has a large number of firms making car parts for larger firms like Toyota so that the larger firms can concentrate on their core production. Since the demand for parts and components generally only comes from firms, the target consumer groups for such markets are usually quite small. This implies that the subcontracting firms that exist in these industries do not need to be big to capture the market share.

Technological Disruptions in the Industry

Changes in demand for businesses due to significant advancements in technology may also allow for the existence of smaller firms. Disruptive technology is an innovation that significantly alters the way that consumers and firms operate. It may sweep away the systems or habits it replaces because it has attributes that are recognisably superior. Recent disruptive technology examples include e-commerce, online news sites, ride-sharing apps, and GPS systems. Firms that are able to ride on and exploit such technological changes may expand and eventually dominate the market, while firms that are slow to respond to technological changes will gradually lose market share and may eventually exit and disappear even though they could have once been a dominant force in that market. Thus, traditional providers of these services would see a fall in demand.

Supply Factors

Method of Production

The nature of the products or services that some firms are providing may affect the size of the firm. For instance, firms in the service sector normally do not require substantial capital outlay in fixed assets so they do not get to enjoy a lot of plant (technical) economies of scale from expansion. The falling portion of the LRAC facing the firms in such industries usually does not extend over a large output range. This is especially so where the element of personalised service is involved, since it is not always possible to introduce standardisation and mass production methods. These firms may not want to expand as this may give rise to internal diseconomies of scale at a relatively low level of output, meaning that the LRAC would rise as the firm expands its scale of production. Hence, since the MES is attained at a very low level of output, efficient firms in such industries are “small”, rather than “big” firms. This is shown in Figure 8 below where firms experience an increase in average costs after QMES units of output and thus firms are likely to limit production to QMES units.

Larger firms exist typically in capital intensive industries as they have very high initial capital outlay. Through expansion, these firms will be able to spread their fixed overhead costs over large output levels and enjoy lower average costs of production. These firms are able to enjoy significant technical (plant) economies of scale, illustrated by the falling portion of their LRAC extending over a large output range as shown in Figure 9. Internal economies of scale can be reaped for a significantly high level of output so large firms have a significantly lower average cost of production and are able to out-compete small firms based on the cost advantage. This is reflected in Figure 9, where MES is at QMES units.

There are also other industries where minimum efficient scale is reached at a low level of output and average cost tends to remain constant or drops only slightly such that big firms do not enjoy any significant average cost advantage over small firms. With reference to Figure 10, small firms could therefore produce at Q1 and large firms could produce at Q2 level of outputs and both big and small firms can co-exist in the industry.

Other Reasons covered in other sections

- Lack of Capital: Small firms may also be unable to expand due to lack of capital. Banks may be unwilling to lend to small firms as they are often considered less credit-worthy. Small firms do not have substantial assets to offer as collateral; hence they are usually financed from personal savings and loans from family and friends. As a result, opportunities for expansion of small firms can be limited. (covered under internal economies of scale)
- Flexibility and Adaptability:
- Barriers to Entry

Internal Economies of Scale

Plant Economies of Scale:

Specialisation and Division of Labour:

A complex manufacturing production process can be broken down into simpler specialised multi-stages. Workers can therefore be allocated to their most efficient specialised stages. Specialisation and division of labour raises productivity because the workers can produce with greater speed and dexterity, and because lesser time is lost from task switching. Training cost is also reduced as with specialisation because workers only need to be trained in their specialised jobs. A lot more output can therefore be produced given a smaller but proportionate increase of inputs.

Higher Utilisation of Indivisible, Highly Efficient Machinery:

Certain types of machines are only available in a fixed productive capacity. Firms with larger scale of production can better utilise these machineries via, for example, working on 24 hours shift as compared to firms with smaller scale of production where the machines may be under-utilised. The percentage increase in the cost of operating the machines such as labour and overhead costs can be insignificant compared to the level of output that can be produced due to the high productivity of the machines when inputs are increased by the same proportion.

Firm Economies of Scale:

Marketing Economies of Scale

The firm can purchase more factor inputs thus giving the firm a greater bargaining power to negotiate for higher bulk purchase discount. Moreover, the firm can also enjoy lower per unit distribution costs because, for example, it can use a slightly more expensive but more cost efficient large truck to deliver its larger amount of goods to its distributors instead of a less cost efficient smaller van. Also, with the larger scale of production, high advertising cost is shared across the larger amount of output produced by increasing inputs by the same proportion.

Organisational Economies of Scale

Rationalisation can take place when the use of a centralised administration makes possible the reduction of duplicated administrative tasks such as the reduction in the combined size of the finance department. For example, despite the relatively larger manpower, procurement and output of the newly merged firm, only one human resource department handling wage matters or one accounting department is required instead of two.

Financial Economies of Scale

The firm may accumulate and thus will have more assets which can be offered as collateral to banks for cheaper loans. Banks are more willing to provide lower interest rates to larger firms because of their lower risk as their high collateral value would reduce the probability of them defaulting the repayments of the loan. A small reduction in the interest rate would result in huge cost savings for loans of large amounts. In addition, the larger firm can also raise funds by issuing shares which increases its cost of production insignificantly as compared to getting a bank loan with high interest payment.

Managerial Economies of Scale

A complex administrative process such as finance process can be broken down into smaller processes such as budgeting and actual payroll matters which are of very different nature and assigned to specialised administrative departments headed by specialised finance trained managers. The specialised department will therefore be better managed, for example, via better budget planning and can better provide specialised in-house training for their specialised administrative personnel thus would improve productivity and communication. As a result, a lot more output can be processed using the same amount or even lesser time and manpower

Risk-Bearing Economies of Scale

The firm can diversify its risk especially when it operates in several markets. For example, in a market where generally consumers are trend-setters and in a market where consumers are generally trend-followers. When there is a change in tastes and preferences away from its product in the trend-setting market resulting in a fall in demand of the product, the large firm can transfer its excess stock of the outdated goods in the trend-setting market to sell in the trend-following market as the goods can still be considered trendy in the trend-following market. Large firms are therefore able to minimise wastage cost and to save on storage cost as compared to a small firm which cannot readily divert its stock due to its limited distribution networks.

OR

The firm can diversify its risk especially when it operates in several markets. For example, the firm can produce products of different income elasticity for countries facing different economic conditions to lower its cost of uncertainty. It can produce a relatively more luxurious product to cater to countries having economic boom and it can produce a relatively more inferior product to cater to countries having economic recession. Doing so allows the firm to offset its fall in revenue in some countries by the increase in revenues in other countries during times of global economic boom or recession. The fall in revenue and hence profits in one market can be offset by those earned in the other markets resulting in the lowering of its cost of uncertainty, for example, via cheaper firm insurance risk premium and cheaper bank loan.

Overall Reduction in Cost Analysis

Due to the above explained internal economies of scale, the increase in the firm's cost of production due to its larger scale of production is thus spread across an even larger level of output. Noting that average cost is equal to total cost divided by the level of output, the firm long run average cost will be lowered from C_1 to C_2 illustrated by a movement from point A to point B along its long run average cost curve (LRAC) when the firm output increases from Q_1 to Q_2 as illustrated in Figure 1.

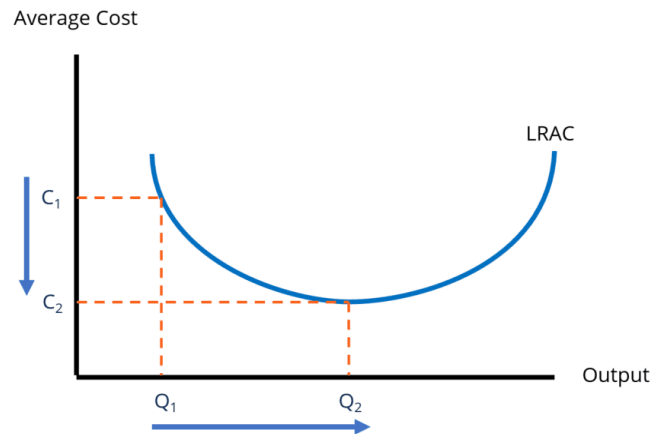


Figure 1: Internal Economies of scale

Internal Diseconomies of Scale

Loss of Control

In the real world, there is imperfect information thus the firm may not know whether it is producing below or above its minimum efficient scale. If it is already producing near or at its minimum efficient scale, it may soon suffer internal diseconomies of scale, thus higher average cost of production as it expands its scale of production further. In an oversized firm, there might be loss of control as it employs more and more workers. It may become difficult to monitor the work performance of the large number of workers and ensure they are fairly treated. Motivation to work will be affected. Besides, problems such as lack of motivation and worker absenteeism may lead to lower productivity and thus increasing the average cost of production.

Loss of Communication

In an oversized firm, there might also be coordination and communication problems across decentralised sections of the firm especially when bureaucratic structure takes shape and coordination becomes more complex. This might result in possible spillover effects of disruptions from one section to later sections especially if the firm involves complex interdependencies. Possible production delays can be costly to the firm especially when the delays involve liquidation damage. Delays may also result in the firm having to operate beyond the usual operating hours in order to deliver the goods, thus increasing the average costs of production due to expensive payment of overtime wages and utilities.

Advantages of Small Firms

Better Communication/ Adaptability and Flexibility

Small firms are more flexible, thus making them more adaptable to changes in market conditions. Being small means that decision making can be quicker as fewer people are involved and there is less bureaucracy in the organisation. The firm is thus able to make changes to its strategies or adjustments to its production faster in response to external changes. For example, in times of recession, the firm may be able to quickly switch its products to more inferior goods to cater to the falling income of consumers. When faced with falling demand, small firms may be better able to adopt cost cutting measures to reduce their cost due to their flexibility e.g. using cheaper materials or offering less services. Moreover, small firms will be better able to react to technological disruptions by adapting their products to align with the new technologies.

Better Control

Small firms can more easily get its workers to extend their working hours when faced with a surge in demand, whereas a large firm may have to go through several procedures such as negotiating with trade unions before making changes to working hours or other working conditions. Small firms may be able to maintain better working relations among the workers as there could be stronger bonding and sense of identity among the workers due to their smaller numbers, making them feel like they are part of a family. This increases the motivation and hence productivity of the workers in the firm, lowering average costs. In contrast, workers in large firms may feel more disengaged and more distant from the management of the company, and thus less motivated in their work. Hence their costs can be lower compared to large firms, even though they are operating on a smaller scale.

Niche Markets & Personalised Services

Small firms are able to cater to more specialised niche markets, which typically have a smaller consumer base. Small firms are also better able to cater to individual needs and preferences and thus provide more personalised services to their customers. Such personalised services enable small firms to gain greater customer loyalty, which the large firms may be unable to achieve. Hence, smaller firms cater to consumers with more specific needs or preferences and thus have relatively more price-inelastic demand. This allows the firm to increase its price without losing significant market share, thus increasing its revenue and profits. Examples can be boutique hotels with special themes, travel agents specialising in eco-tourism and minimarts selling only organic products.

Financial Support from the Government

Small firms may also have access to various assistance schemes and financial support provided by the government. For example, Enterprise Singapore, a government statutory board, offers various financial assistance schemes such as Productivity Solutions Grant and Enterprise Development Grant to help Small and Medium-Sized Enterprises (SMEs) in Singapore to develop their capability or venture into overseas markets.

External Economies of Scale

Economies of Disintegration

With the expansion of the industry, a network of auxiliary firms providing support to the production process of the industry, for example production of intermediate products (e.g. spare parts of medical equipment), might develop. This creates the possibility of many subcontracting relationships between the firms and auxiliary firms. As the specialised components are mass produced by respective specialised auxiliary firms, these auxiliary firms could enjoy internal economies of scale such as plant internal economies of scale via specialisation and division of labour; thus lowering their average costs of production. (Note: Do not be confused, The focus of this whole point is on EEOS not IEOS thus you do NOT need to explain the plant internal economies of scale in depth. We are just using IEOS as part of the explanation to explain the cost-savings that auxiliary firms can enjoy. This would then enable us to explain why LRAC of the firms in question can be lowered.) On one hand, firms in question can outsource the manufacturing of certain components of their final product to the auxiliary firms so that the firms in question can concentrate on their core production. On the other hand, the auxiliary firms can pass the lower costs in terms of lower prices to firms that outsource to them. Overall, firms in the industry can lower their production cost via outsourcing as compared to producing all the components themselves; thus might lower their long run average costs.

Economies of Information

With the expansion of the industry, supporting firms offering research services or common information for the industry, for example data analysis of less sensitive information (e.g. efficacy of medical treatments), might develop. The firms can therefore obtain up-to-date information on recent and most efficient techniques (e.g. medical treatments) or best practices at a lower cost through cost-sharing instead of spending on costly independent research. Overall, firms in the industry can lower their costs of obtaining information as compared to collecting their own information; thus might lower their long run average cost.

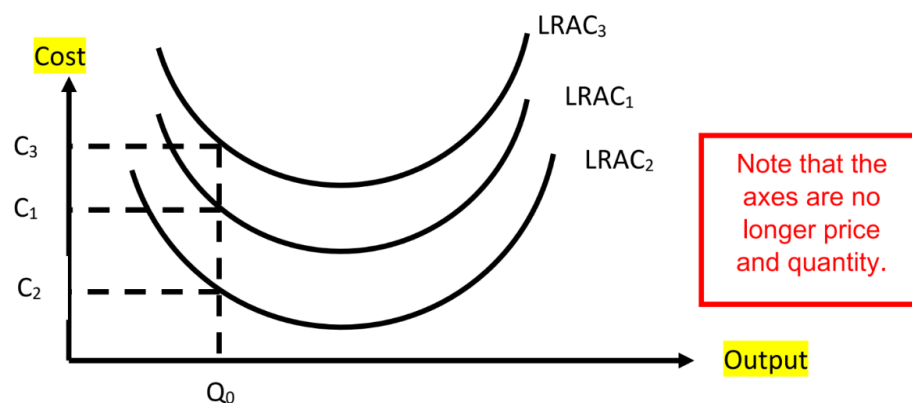
Economies of Concentration

With the expansion of the industry (e.g. healthcare), the demand for trained workers (e.g. nurses) increases. Courses might be set up by educational institutions to provide the necessary training leading to an increase in the availability of the required trained labour (e.g. nurses). This provides the firms ready access to a larger pool of trained labour which will minimise their searching costs such as costs arising from intensive local and overseas advertisement and recruitment. Also, some in-house training can be reduced as the trained labour would already have the skill prerequisites (e.g. new medical processes) required to take up the job. Therefore, training costs can be reduced.

In addition, due to the concentration of rival firms selling substitutes in consumption locating in close proximity as the industry expands, the firms can share the maintenance and operating costs of costly infrastructures (e.g. drug testing lab) that was set up by a third party or the government for the expanding industry. Overall, firms in the industry can lower their searching, training and infrastructure costs as compared to having their own search, training and infrastructures arrangement thus lowering their long run average costs.

Overall Reduction in Cost Analysis

The lowering of long run average cost can be illustrated by a shift of the long run average curve from $LRAC_1$ to $LRAC_2$ as shown in Diagram1. Assuming a firm's output remains at Q_0 , its long run average cost of production falls from C_1 to C_2 .



External Diseconomies of Scale

When an industry becomes too large, the competition for common but scarce factors of production would be intense. The huge increase in demand would result in a significant increase in the price of the factor of production especially when the supply of the factor of production is price inelastic perhaps because the required skills of the required labour would take a long time to master. In order to obtain the factor of production to produce their goods and services, firms in the industry would bid up the prices resulting in significant increase in their cost of production as illustrated by a shift of the firm's long run average cost curve from $LRAC_1$ to $LRAC_3$ as shown in Diagram 1; thus given output is at Q_0 , the cost would increase from C_1 to C_3 .

Moreover, as more and more firms share the common facilities and infrastructures, wear and tear would be rapid and soon the facilities and infrastructures would be stretched to the limit giving rise to overcrowding and other problems e.g. frequent breakdown of facilities, causing lower productivity and hence long run average cost increases as well.

Alternative Objectives of Firms

Profit-Satisficing Behaviour

In reality, firms do not have perfect information about the demand for their products nor their implicit costs of production. Given the constraint of imperfect information, they may aim to achieve a satisfactory level of profit rather than maximise their profit. For example, during uncertain economic conditions where there are large fluctuations in crude oil prices and changes in consumers' taste and preferences for the distillates of crude oil, ExxonMobil may aim to profit-satisfice because the firm is not able to accurately estimate the marginal costs of production and marginal revenue to achieve profit maximisation. Given that ExxonMobil is a multinational company with several production locations and multiple product offerings thus difficult to achieve accurate cost and revenue estimation, to accurately achieve profit maximisation is challenging thus making profit-satisficing the more achievable objective. Also, as a large multinational company which is managed by employed executives, there is a separation between the ownership of ExxonMobil (by shareholders) and the control of the company by paid managers. This gives rise to the principal-agent problem, where the salaried managers' may only aim to achieve a profit level that will satisfy the shareholders. As its shareholders are far removed from the operations of the firm to be fully aware of the decisions that need to be made in order to maximise profit, the firm's managers have greater autonomy in deciding the acceptable level of profit that will satisfy the shareholders. Hence, the firm's objective may be to achieve a satisfactory level of profit rather than the maximum profit possible.

Market Share Dominance

Firms may aim to increase their market share in order to gain greater dominance in the market, thus giving them more market power. Globally, ExxonMobil is operating in a competitive industry and the firm may be willing to forgo short-run profits through the use of price and non-price measures to increase its market share. For example, ExxonMobil might practise predatory pricing, engage in costly advertising or provide free gifts to induce demand for its products. During the screening of Rio Olympics in 2016, ExxonMobil engaged in a high-profile advertising campaign. Since the cost of running the worldwide advertising campaign could have been very significant while it may not have immediate impact on its demand, ExxonMobil would not have been maximising its profit in the short term. Nevertheless, in the longer term, the image of the company would improve as a result of the advertising campaign, which would lead to an increase in the demand of its products and hence its revenue. Moreover, with an increase in market share, the firm faces a more price inelastic demand curve. This allows it to set higher prices for its products, which increases total revenue and profits in the long run, allowing it to maximise profit in the long run.

Managerial Utility Maximisation

As a large multinational company which is managed by employed executives, there is a separation between the ownership of ExxonMobil (by shareholders) and the control of the company by paid managers e.g. pricing and output decisions are left up to the managers. This gives rise to the principal-agent problem where the hired managers control the company on behalf of the shareholders who own the company. The managers do not necessarily aim to maximise profit. The managers may seek to maximise their own utility in areas like staff salary and bonuses as well as incentives such as entertainment allowances and lavishly furnished offices. These additional expenses will lead the firm to experience higher marginal and average costs. This means that the firm may not be minimising its costs, thus resulting in lower profit.

Growth Maximisation

ExxonMobil's internal expansion may have reflected its growth maximisation objective. For the oil refining industry, high start-up costs are required for the building of infrastructure such as the processing plants to refine oil. So, the MES is only attained at a relatively high level of output. By maximising growth through expansion of output, the firm is then able to enjoy significant cost advantages. It can optimally utilise its indivisible processing plants to spread the cost over larger output levels, thereby lowering average costs, compared to smaller production scale. However, in the process of expanding, profits may not be maximised due to excessive expansion of production capacity, leading to inability to fully utilise it in the short run. If the expansion of the production is not matched by an increase in demand, the firm may be producing at an output where its marginal revenue is less than its marginal cost, thus failing to maximise its profit. Nevertheless, ExxonMobil might have expanded to be recognised as a rapidly growing 'dynamic' organisation, especially with the opportunity to capture the market around Asia. As ExxonMobil expands in size, it may be able to increase its market share, thereby increasing its market power and revenue in the longer term. Even though it may not be maximising profit currently, growth maximisation could be an objective that helps ExxonMobil to profit-maximise in the long run since it brings about significant cost and revenue advantages in the long term.

Revenue Maximisation

ExxonMobil may choose to maximise revenue rather than profits especially since it is a large company where decisions are made by managers rather than the shareholders. This is because sales revenue is often used to judge the success of the managers. Thus, output may be set where marginal revenue (MR) is zero, at QRM so that total revenue is at a maximum, as shown in Figure 1. For every additional unit beyond Q0, which is the profit maximising level of output, the marginal cost (MC) is greater than the marginal revenue. The production of the additional units of output add more to cost than revenue, lowering profits. The higher output level leads to a lower price and lower profit as compared to the profit maximising level.

Barriers to Entry

Barriers to entry refer to any impediments that prevent new firms from competing on an equal basis with existing firms in an industry. Barriers to entry can be natural or artificial.

- It is important to define this

Natural or Structural Barriers

These are barriers that exist by nature of the industry or product or due to existing technological or structural factors relating to the incumbent monopolist that prevent other firms from entering.

Control of Essential Resources/Control of Access to Markets

A monopolist may enjoy the exclusive ownership or control of raw materials which are absolutely essential in making a product and thus preventing the entry of rival firms. These higher profits could create a natural barrier to entry to prevent potential competitors from entering the market due to their lower demand of its potential rival and not being profitable.

Technological Superiority

A firm which possesses technology which is far ahead of that of its rivals can be in a monopoly position. Technological superiority creates a situation where potential rival firms are unable to be quality competitive since the products they produce are inferior.

- It is important to note that this is not done intentionally by the firm to prevent the entry of other firms, but rather just as a nature of an industry that has advanced significantly.

Economies of Scale

In some industries, the Minimum Efficient Scale (MES) of production occurs at a high level of output. This means that the firm which enters the industry first will be able to operate on a vast scale and produce at a low average cost. This deters new entrants, who do not have a large consumer base to warrant a high level of production. New entrants would hence have to produce at higher average costs which might be unprofitable.

Artificial or Strategic Barriers

These are man-made barriers that are erected by firms or institutions to restrict the entry of new firms into the industry. They could be created by the deliberate action of incumbent firms as part of their strategy to reduce competition or prevent new firms from entering the industry.

Contrived Barriers/ Deliberately Erected Barriers

An established firm or group of firms may attempt to preserve its dominant position by making entry for others difficult. This usually involves high spending such that any potential entrant is forced to match up to that expenditure should it wish to be in the market. This may also create customer loyalty, making it difficult for new firms to attract customers. E.g. advertising, branding, R&D.

Limit Pricing

Limit pricing is a pricing strategy adopted by a monopolist to deter potential entrants by charging a price low enough to make it unprofitable for the new firm entering the industry. Limit pricing is possible when incumbent firms have certain cost advantages that are not available to new firms, thus resulting in new firms having higher cost structures (e.g. due to internal economies of scale enjoyed by the incumbent monopolist as it is supplying the whole market). This allows the monopolist to charge a lower price that would be below the average cost of the new firms.

Legal or Statutory Barriers

In many cases, monopolies arise because the government has given one person or firm the exclusive right to sell some goods or services. The firm's monopoly position may be directly protected by:

- various forms of government licensing (allowing, say, only one firm to operate in a particular area – example, postal and bus services)
- by tariffs (i.e. customs duties) and other trade restrictions to keep out foreign competitors.
- A special class of legal protection called patents. A patent is a privilege granted to an inventor that prohibits anyone else from producing or using that invention without the permission of the patent holder, for a specified period of time. Often, this includes discovering new uses of a product, or a new way of producing a product.
- Exclusive rights given to certain firms are another form of statutory barriers which result in firms having monopoly power.

Network Effects

Network effects occur when the value of a good or service increases as more and more people use the good or service. They refer to the value individuals derive from the use of the good by other users. They are also known as network externalities or demand-side economies of scale. Network effects can create a bandwagon effect, as the increase in the use of a good or service by more people in turn attracts more users, resulting in a positive feedback loop.

Existing firms tend to have an extensive network with many users. This makes it more valuable to current and new customers, thereby creating consumer loyalty which makes it difficult for new entrants to draw customers away from incumbent firms.

When one type of technology dominates, it is very hard for a new firm to enter the market with different technology, especially if it is not compatible with the existing technology. E.g. Most people use Microsoft Office software such as Word, Excel and Powerpoint in their work. It is very difficult for a new entrant to introduce a different product as it would not be compatible with the documents used by most people, and thus would not gain a critical mass of users.

Market Equilibrium

Perfect Competition

A perfectly competitive (PC) firm faces a perfectly price elastic demand (i.e. $|PED| = \infty$) for its good as there is a large number of small firms in the market selling homogenous goods so the PC firm has negligible market share so it has no market power. This is because if a particular PC firm increases its price, all its consumers, having perfect information, would switch to other relatively cheaper perfect substitutes in the market and thus, quantity demanded for this particular PC firm would decrease to zero, causing a loss in revenue for the firm. If a PC firm can sell all its output at the current higher price, the profit-maximising firm would not want to sell its goods at a lower price. These suggest that a PC firm is a price taker, taking market equilibrium price as given. The market equilibrium price is determined by the intersection of the market demand curve illustrated by D_0 and the market supply curve illustrated by S_0 in Fig 1. The perfectly price elastic demand curve of a PC firm is thus illustrated by $AR_0 = MR_0$. A profit-maximising PC firm would produce an output level Q_0 where marginal revenue (MR) is equal to marginal cost (MC) in Fig 1 and charge the market price P_0 .

An increase in market demand from D_0 to D_1 causing market prices to rise from P_0 to P_1 would cause an increase in the demand for a PC firm's products, illustrated by an increase in their average revenue (AR) from AR_0 to AR_1 . Hence, at the new profit-maximising output Q_1 where $MR_1 = MC$, a PC firm earns supernormal profit in the short run. With the absence of barriers to entry, new firms incentivised by the supernormal profits will enter the market until the supernormal profit is completely eroded away. The increase in the number of firms would shift the supply curve from S_0 to S_1 , decreasing prices from P_0 to P_1 . With a larger number of firms in the market, each PC firm would face a smaller market share, illustrated by a fall in demand of a PC firm from AR_1 back to AR_0 . Therefore, the PC firm will decrease its output from Q_1 to Q_0 . The price the PC firm charges will also decrease from P_1 to P_0 , where $AR = AC$. Hence, in the long run, PC firms earn normal profit.

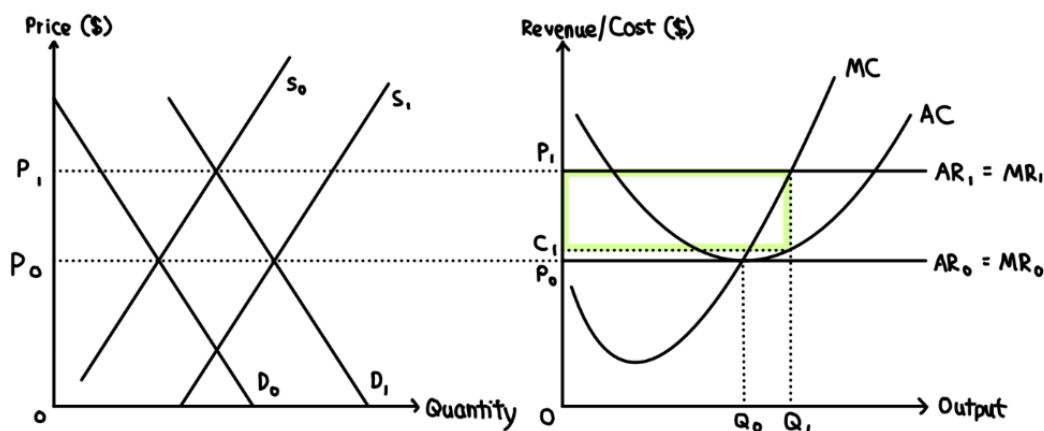


Fig 1: Increase in Demand in a Perfectly Competitive Industry

Conversely, when demand falls causing price to fall from P_0 to P_2 , there is a decrease in the AR of the perfectly competitive firm from AR_0 to AR_1 and the profit maximising level of output shifts from Q_0 to Q_2 . In the short run, at Q_2 , $AC > AR = P_2$ and all firms make subnormal profits. Firms which do not have sufficient accumulated profits will eventually shut down in the long run as they cannot sustain losses for a sufficient period of time. Hence, this causes the number of sellers to fall, decreasing supply for the good until prices rise back to P_0 .

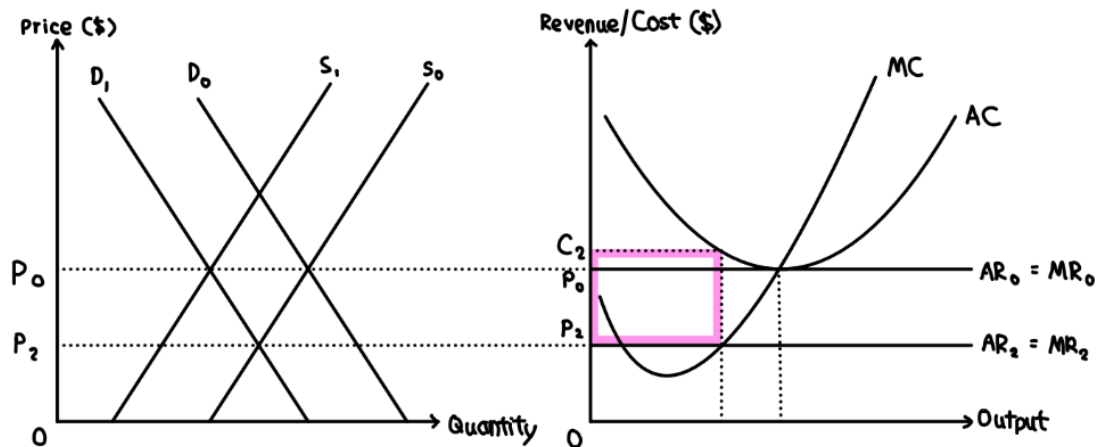


Fig 2: Decrease in Demand in a Perfectly Competitive Industry

A perfectly competitive firm is allocatively efficient in the short run and long run because the profit-maximising level of output where $MR = MC$ is also where $P = MC$ since $P = MR = MC$. Hence, any further increase in production would cause the valuation of the goods by society (given by P) to fall under the additional cost to society (given by MC), and vice versa if production decreases. Hence, at equilibrium, the perfectly competitive firm allocates resources to production of goods in a manner to maximise societal welfare.

A perfectly competitive firm is also productively efficient in the long run as it has no choice but to produce at a point on the LRAC. This is because the perfectly competitive firm is a price taker and the price it sells at is determined by market forces due to the large number of sellers of a homogeneous good and perfect information in the market. In the long run, it produces with normal profits and if it does not use the least cost combination of inputs to produce the profit maximising level of output, its average cost will rise above the average revenue and the firm would make subnormal profits. Hence, the firm must produce on the LRAC.

Perfectly competitive firms cannot engage in most strategies due to perfect information, which implies that their attempt to carry out any strategy would be countered by a strategy of other firms so that no firms gain profits.

Monopolistic Competition

In a monopolistic competition, the demand curve is price elastic as there are a large number of sellers who sell slightly differentiated products and there are low barriers to entry. $|PED| > 1$, since the quantity demanded of a firm's product would fall more than proportionately if it raises its prices since many would switch to cheaper alternatives which satisfy a similar purpose. On the other hand, a firm would decrease its price since the quantity demanded would increase more than proportionately to the fall in price, causing a net increase in revenue (using Chapter 2 TR analysis), allowing the firm to maximise profits, holding costs constant. As such, the large number of close substitutes means firms tend to have low market power and sell at high output to lower prices.

In the long run, a firm in monopolistic competition makes normal profits where $P_0 = AR_0 = AC$. Since there is a very large number of sellers in a monopolistic competition, each firm has a small market share and hence has limited market power. Firms can enter and leave easily due to the low barriers to entry. Therefore, it has low price setting ability and the equilibrium price P_0 is largely determined by free market forces. (Similar analysis from perfectly competitive long run equilibrium follows).

A firm in monopolistic competition is productively efficient in the long run as it has no choice but to produce at a point on the LRAC. This is because the firm in a monopolistic competition has low price setting ability and the price it sells at is determined largely by market forces due to the large number of sellers of a slightly differentiated good in the market. In the long run, it produces with normal profits and if it does not use the least cost combination of inputs to produce the profit maximising level of output, its average cost will rise above the average revenue and the firm would make subnormal profits. Hence, the firm must produce on the LRAC.

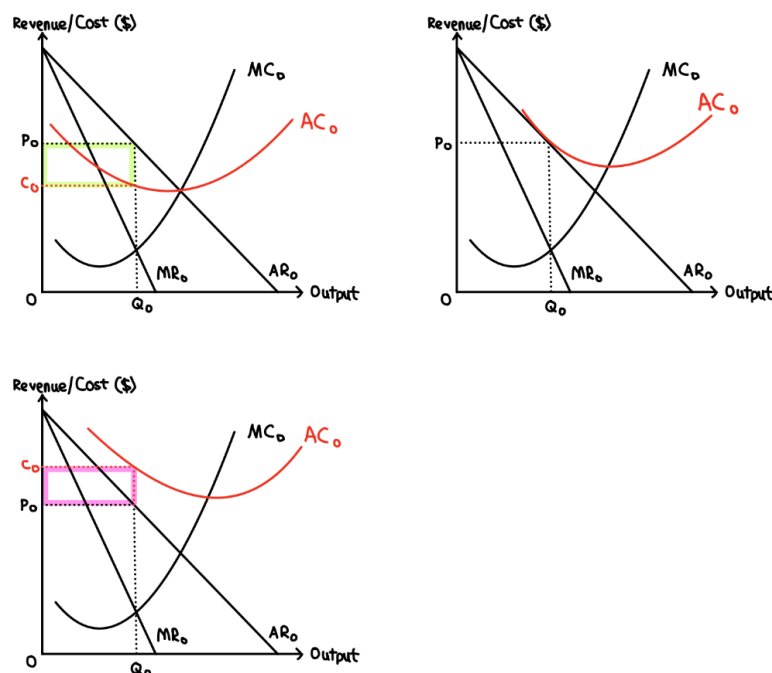


Fig 3: Equilibrium Position in Monopolistic Competition

Competitive Oligopoly

In a competitive oligopolistic market where there are relatively high barriers to entry and thus there are only a few dominant firms with each firm having large market shares, there is stronger but less competition. Price in a competitive oligopolistic market is more stable due to price rigidity caused by mutual interdependence between firms in the market. Mutual interdependence occurs where a firm is affected by its rivals' decisions and its own decisions affect its rivals' decisions. This is because each firm in a competitive oligopolistic market has large market shares thus the decision of any one firm to either raise or lower its price would in turn impact rival firms in the market.

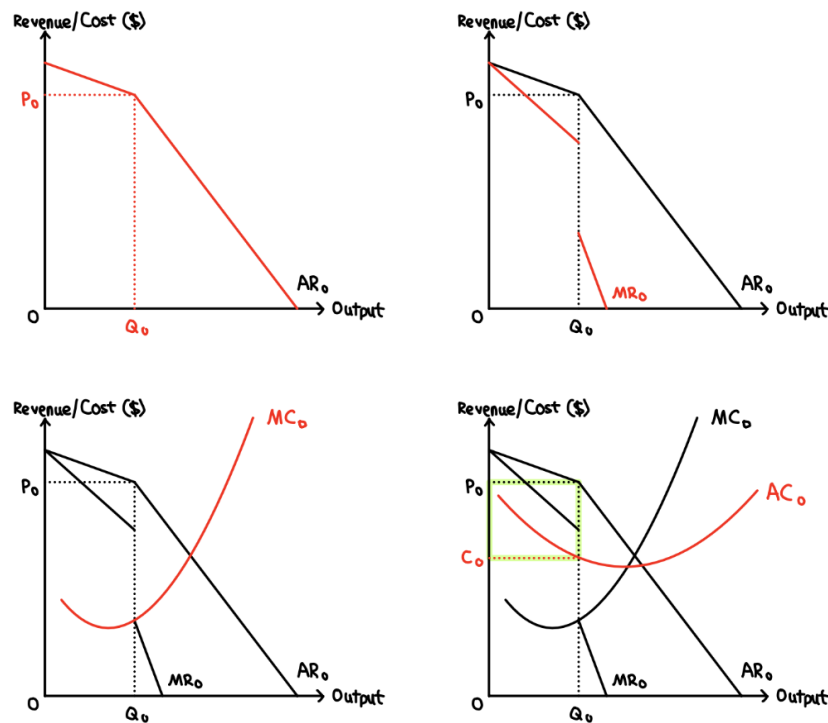


Fig 3: How to draw the Kinked Demand Curve

For example, when one of the firms decreases its price, consumers of its rivals would switch to buying from the former and the latter would lose market shares if the latter does not lower their prices. Therefore, all other firms in the competitive oligopolistic market are likely to match the lowered price rather than risk losing their market shares. If so, the firm that lowers its price will experience a less than proportionate increase in quantity demanded so it faces a price inelastic demand curve above P_o as illustrated in Fig 3. On the contrary, when one firm raises its price, rival firms would not follow suit because the rival firms can gain a larger market share if they just keep their prices constant. If so, the firm that increases its price would face a more than proportionate decrease in quantity demanded so it faces a price elastic demand curve below P_o as illustrated in Fig 3. When there are changes in demand and supply conditions in the market, due to the mutual interdependence between firms in a competitive oligopolistic market, there is little incentive for the firms to increase or decrease prices even if there is an increase in cost of production.

Monopoly/ Collusive Oligopoly

A firm with market dominance such as a monopoly faces a price inelastic demand (i.e. $|PED| < 1$) for its good. This is because the monopolist has a high market share and hence a high level of market power. Given that the monopolist is the only dominant firm in the market and that the monopolist sells a unique good, when the monopolist increases its price, consumers would have no close substitutes to turn to and thus, quantity demanded for the monopolist's goods would decrease less than proportionately. Hence, it is a price setter. The downward sloping price inelastic demand curve of the monopolist is illustrated by AR_0 in Fig 4. The profit maximising monopolist would produce an output level where marginal revenue (MR) is equal to marginal cost (MC) as at Q_0 in Fig 4. The highest price the monopolist can charge at a particular output level is determined by its price inelastic demand curve which is also its average revenue curve (AR). The monopolist will thus charge the price P_0 by restricting its output to Q_0 . Given average cost illustrated by AC_0 in Fig 4, the monopolist would earn supernormal profit even into the long run due to high barriers to entry in the market which prevent new firms from entering the market easily to share any existing supernormal profit in the market. (Explain one barrier to entry)

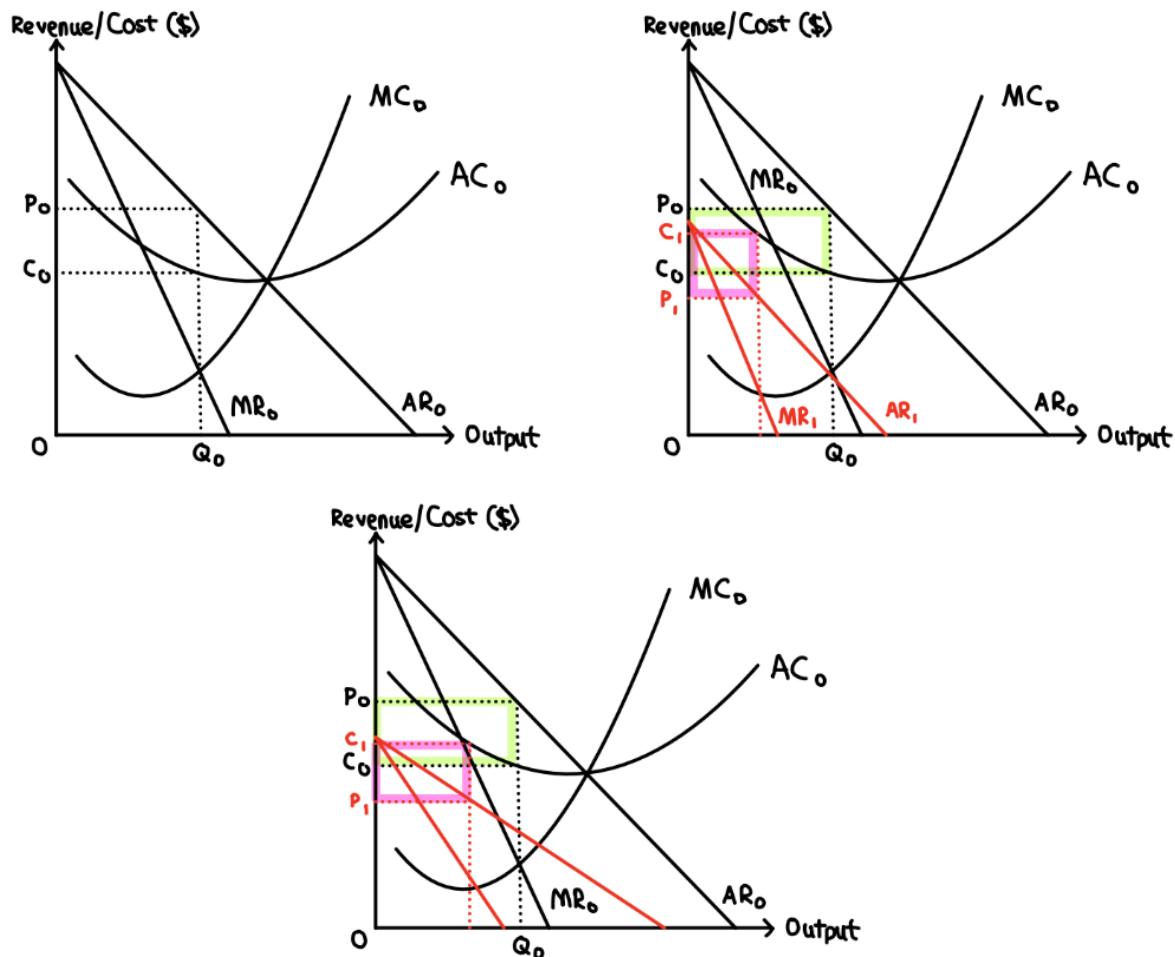


Fig 5: Fall in Market Demand VS Fall in Market Share

Natural Monopoly

A Natural Monopoly occurs when a single firm can supply a good or service to an entire market at a lower average cost than two or more firms can. Whilst it may be possible for a single large firm to earn supernormal profit, if two large firms were to supply to the market, they might both make losses. We describe such an industry as a natural monopoly. We represent a natural monopoly diagrammatically by drawing an AC curve which is falling over the entire range of consumer demand. Natural monopolies occur because of the high set-up cost of the technology or infrastructure required for an industry. The high capital outlay or sunk cost results in significant plant or technical economies of scale as it is spread over a large output. For example, the transmission of electricity is a natural monopoly; once a grid is built, it can supply a very large range of output, leading to a continuously decreasing AC over the entire range of consumer demand.

Referring to Figure 6, the profit maximising equilibrium of the monopolist is at Q, where the monopolist makes a supernormal profit of Pabc. However, if another firm were to enter the industry and assuming that the market is divided equally between the two firms, each firm will now face a demand curve that is half of the original demand curve of the monopolist. The demand curve facing each of the two firms will thus be equivalent to the MR curve of the original monopolist. (Since the MR is half of the AR, the MR of the original monopolist now becomes the AR of the duopolist. Since MR lies below the AC throughout its range of output, this means that the demand curve or AR of each of the two firms in the industry falls below the AC, which means that both firms will face losses at all levels of output. Hence, it will not be profitable to have more than one firm in the industry.

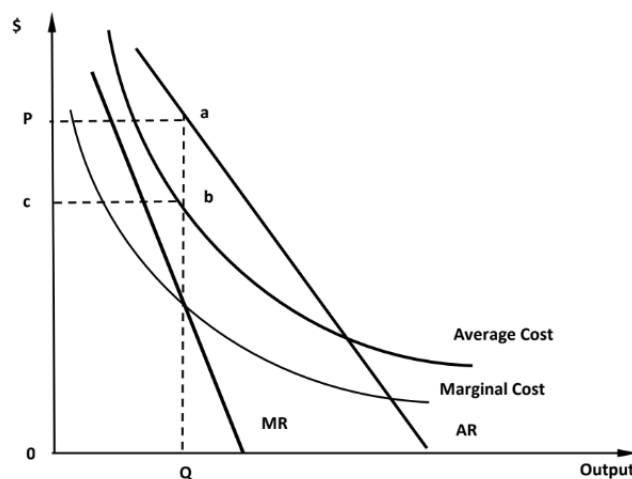


Fig 6: Natural Monopoly

Shut-Down Condition

Set up Context

The firm's decision to close depends on the level of profit/loss it is making. As firms are profit maximisers, they will aim to maximise revenue and minimise costs.

Condition for Production in both short and long run

As long as $AR \geq AC$, the firm is making supernormal or normal profits and will continue production. If the firm makes subnormal profits on the other hand, where $AR < AC$, variable and fixed costs of production need to be considered to determine whether the firm will shut down in the short run.

Condition for Shutting Down in the short run

Suppose at the new profit-maximising output of Q_1 where $MR_1 = MC$, the firm charges a price of P_1 which is now lower than AC and the firm is making subnormal profit. Its decision whether to shut down in the short-run will depend on whether its revenue is able to cover at least its variable costs. If P_1 is still higher than AVC , then the firm will not shut down as $AR > AVC$. This is because in the short-run, fixed costs must be paid, even if the firm is shut down, the firm is committed to paying rent. Therefore, if the firm stops production, it will make a loss equivalent to its total fixed costs (area). However if it continues production, even though it starts to incur the variable costs, the revenue earned can pay for the variable costs. And if the revenue can cover more than the variable costs, the firm can cover part of the fixed costs. This means that the loss incurred by continuing production in this case (area) is smaller than by shutting down. The firm will not shut down so as to minimise costs

Suppose at the new profit-maximising output of Q_2 where $MR_2 = MC$, the firm charges a price of P_2 which is lower than AC and AVC and the firm makes subnormal profits. Since the $AR < AC$ and the $AR < AVC$, the firm will shut down because the revenue the firm is making cannot cover its variable costs, much less its fixed costs. If it continues production, its loss is (area), which is equal to both its fixed costs and part of the variable costs not covered by its revenue. In shutting down, the firm only incurs the fixed costs of production illustrated by (area) and not the variable costs, thus shutting down would result in a smaller cost compared to continuing production.

Condition for Shutting Down in the long run

In the long run, when there are no more fixed costs, the firm will shut down if the AR falls below AC . In the long run, if the firm continues to incur losses, it is not making the minimum profit required for it to remain in the business, and hence the firm will decide to shut down.

Impact of Firms' Strategies

Allocative Efficiency

With its market power, a profit maximising dominant firm such as a monopoly is very likely to restrict output to Q_M to charge a high price P_M at where marginal revenue (MR) is equal to marginal cost (MC) as illustrated in Diagram 1. The price P_M is higher than the price level in a perfectly competitive market illustrated by P_{PC} and higher than the marginal cost of the dominant firm as illustrated by C_M . Output level is below competitive level Q_{PC} .

Given the average cost (AC) curve as illustrated in Diagram 1, the dominant firm earns supernormal profit as illustrated by area P_MABC . Due to high barriers to entry, for example the established reputation of the dominant firm and the threat of predatory pricing from the dominant firm, the dominant firm is able to continue to earn supernormal profit in the long run.

Allocative efficiency is achieved where price (given by the AR curve) equals marginal cost of production (i.e. $P = MC$) because this is where any reallocation of resources will not lead to further increase social welfare. As illustrated in Diagram 1, this is where market or the monopolist's demand $AR = D$ is equal to market supply or the upward sloping portion of the monopolist's marginal cost at E_{PC} with market price P_{PC} and output Q_{PC} . In the case of a dominant firm, $P_M > C_M$, suggesting that consumers' valuation of the additional unit of output is greater than the opportunity cost of the additional unit of output. Thus, allocation of more resources to the production of the good would thus increase social welfare. The under-production of $Q_{PC}Q_M$ results in the potential social benefits lost illustrated by area $Q_MAE_{PC}Q_{PC}$ is larger than the potential social cost incurred illustrated by area $Q_MCE_{PC}Q_{PC}$. This would lead to a deadweight loss illustrated by area $AE_{PC}C$. The good is said to be under-produced by $Q_{PC} - Q_M$ with $P_M > C_M$ thus the dominant firm is allocative inefficient and hence social welfare is not maximised.

Productive Efficiency

Also, because the dominant firm earns long run supernormal profit (as explained earlier) but faces low competition due to the high barriers to entry thus can be complacent, the dominant firm might be X-inefficient thus productively inefficient. A X-inefficient dominant firm produces Q_M level of output with C_x level of average cost rather than producing Q_M level of output at the lowest possible cost on the LRAC curve with average cost C as illustrated in Diagram 1. This is because with low competitive pressure on profit margins, the dominant firm might lax on cost controls/ over-remunerating their staff with huge perks and bonus packages/ hiring more staff than necessary/ pay large amount of rents to locate their offices in prestigious locations/ not use the most updated and efficient production methods. The dominant firm might thus pass the higher cost in terms of higher prices to consumers thus lowering consumer surplus (explained later).

Equity

In addition, the high price (especially for necessity goods such as public transport and electricity) would make the goods unaffordable to lower income households because they are less able to pay thus equity is negatively affected.

AND/OR

Also, markets dominated by a large firm also contribute to unfair income distribution. The supernormal profit explained earlier is not widely redistributed because corporate stock ownership is usually concentrated in the hands of upper income groups and/or redistributed to the top management of the firms in the form of bonuses. Hence, producers gain at the expense of consumers. Therefore, there is inequity.

Consumer Surplus Negative Argument

Furthermore, when the dominant firm restricts output to charge a high price P_M , consumer surplus, given by the difference between what the consumers are willing to pay and what they actually pay is low. Also, the amount of goods available for consumption is also low at Q_M . Examples of market dominance can be seen in the pharmaceutical market where new drugs are protected by high barriers to entry such as patents during which the price of these new drugs will be exorbitantly much higher before the patents expire.

Consumer Surplus Positive Argument via IEOS

When a firm dominates the market, it suggests that the firm holds significant market share and thus is producing at a high level of output and having a large scale of production. As a result, the dominant firm is able to enjoy internal economies of scale thus lowering its long run average cost. If the dominant firm passes the lower cost to consumers in terms of lower price, consumer surplus would increase. For example, the dominant firm might be able to enjoy (explain a contextualised IEOS that a dominant firm is able to enjoy using notes 1)

Extension of logic with Natural Monopoly:

In addition, in the case of a natural monopoly especially in transportation, electricity generation and provision of utilities, it can be argued that government might not be beneficial thus not be needed when a natural monopoly dominates the market. Natural monopolies occur when a single firm can supply a good to an entire market at lower cost than if supplied by two or more firms. This is because a natural monopoly is more cost efficient due to substantial IEOS it can enjoy by producing at a large scale of production. Having more than one firm in the market via liberalisation or lowering barriers to entry (e.g. relaxing of regulations) might cause its average costs to be higher than the price, thus causing the natural monopoly to incur losses and eventually shut down. As a result, there would be maximum deadweight losses with zero production. If so, having no government intervention would result in less deadweight loss with a positive level of production and thus more beneficial to society.

Variety and Quality, Linking to Dynamic Efficiency

Moreover, the supernormal profit that a dominant firm makes in the long run (as explained earlier) would afford the firm the ability to engage in product and process innovation. If the firm engages in product innovation to create better quality and new varieties of products that allow consumers to enjoy a higher level of satisfaction, consumer surplus would increase. If the firm engages in process innovation by conducting research and development, for example cost reduction technology, the society might benefit from the firm having dynamic efficiency. Dynamic efficiency is achieved when a firm is technologically progressive in order to reduce the average cost of production illustrated by the downward shift of its LRAC or to meet the changing needs and wants of consumers over time. If the firm passes the lower cost in terms of lower price to consumers and consumers get, consumer surplus would increase.