

## 7. The price system and the microeconomy

### 7.1 Utility

#### Syllabus 7.1 >

- Definition and calculation of total utility and marginal utility
- Diminishing marginal utility
- Equi-marginal principle
- Derivation of an individual demand curve
- Limitations of marginal utility theory and its assumptions of rational behaviour

#### Total & Marginal Utilities

- **Utility:** The satisfaction from consuming a good or services.
  - Satisfaction comes from the **consumption** not **purchase**.
- **Rational consumer:** A utility maximizing individual that has access to complete information and makes choice independent of other consumers.

#### Total Utility

- The **sum** of utility received from the consumption of **all units** of a product over a *period of time*.

$$TU_x = u_1 + u_2 + u_3 + \dots + u_x$$

- Assumes that amount of utility generated can be **explicitly measured**.

#### Marginal Utility

- The utility received from the consumption of **last unit** of a product over a *period of time*.

$$MU_x = \frac{\Delta TU_x}{\Delta Q_x}$$

- **The paradox of value:** The price of a good is determined by its **marginal utility** instead of total utility.
  - For example, water is a necessity for survival, but it's much cheaper than diamond, one with a high mu due to scarcity.

#### Law of Diminishing Marginal Utility

##### Law of Diminishing Marginal Utility

As the quantity consumed of a product **increases**, the utility derived from each **successive unit** goes on **diminishing**.

#### Derivation of an individual's demand schedule (Intuitively)

- We assume that the marginal utility of a product can be measured by **an amount of money** an individual is prepared for it.

- **Marginal utility theory** states that a rational individual will wish to **maximize their total utility** by consuming a product up to a point where

$$P = MU.$$

- Therefore, an individual's demand curve for a product will be of the same shape as their marginal utility curve ( $MU = D$ ).

## Equi-Marginal Principle

### Equi-Marginal Principle

An individual with **limited income** can **maximise his total utility** by **buying each good until his marginal utility per dollar** of each good are equal.

$$\frac{MU_a}{P_a} = \frac{MU_b}{P_b} = \frac{MU_c}{P_{ac}} = \dots$$

- Every dollar is spent on the unit with the **highest marginal utility**.

## Derivation of an individual's demand schedule (Theoretically)

- Consider the situation where the **price of good A falls**.
- The utility per dollar for good A is more than good B.

$$\frac{MU_a}{P_a} > \frac{MU_b}{P_b}$$

- In order to increase **total utility**, a rational individual will consume more quantity of good A, due to the law of equi-marginal principle.
- As stated in the **law of diminishing marginal utility**, as consumption of good A increases, the marginal utility derived from good A will diminish until the equi-marginal condition has been restored and total utility is maximized.

$$\frac{MU_a}{P_a} = \frac{MU_b}{P_b}$$

- A fall in the price of good A has resulted in an increase in quantity demanded → the individual demand curve is downward sloping.

## Assumptions of Diminishing Marginal Utility

- Consumers behave in a **rational manner** — they seek to maximize their total utility.
- Consumers have **limited income** — they have to make choice among products.
- Consumer's **preference remains the same** during the period of time.
- Unit of product should be **standard**.
- There must be **continuity in consumption** at a short time.

## Limitations of Marginal Utility Theory

- **Measurability of utility**: Utility is a **subjective** concept without a **standard of measurement**; it is impossible to **compare** utilities.
- **Assumption of rational behaviour** — habit, impulse, mental conditions...

- **Other things remain constant** — e.g., income, tastes and preferences.
- **Rare collections:** The marginal utility of some good increases as consumption increases.

## Behavioral Economics (Not in Syllabus)

### Meaning of **rational behavior** in mainstream Economics

- Individuals act solely to **maximize** their own personal utility.
- Individuals have access to **all information** they need at low/zero cost.
- Consumer decisions are based upon a **careful comparison** of the costs and benefits.
- Once behavior has been optimized, decision-making is based on **changes at the margin**.
- Individuals' **preferences and attitude to risk are fixed**.

### Behavioral factors limiting rationality

1. **Bounded rationality:** individuals are limited by the information they have, their cognitive abilities, and the time available, leading them to make sacrifices rather than optimal choices.
2. **Heuristics:** Rules of thumb that speeds up decision making.
  1. **Anchoring:** Tendency to rely on first piece of information obtained.
  2. **Availability:** Basing decisions on the easiest piece of information recalled.
  3. **Representativeness:** Basing decisions on generalizations or experiences.
3. **Framing:** The different ways the same piece of information is presented can influence decisions.
4. **Endowment effect:** Individuals value something more highly simply because they own it.
5. **Loss Aversion:** Individuals feel the pain of losses more strongly than the pleasure of equivalent gains.
6. **Reference points:** Individuals base decisions on the estimated gains and losses from their position now rather than the whole picture.
7. **Certainty v.s. uncertainty:** Individuals prefer certainty.
8. **Over-confidence and over-optimism:** Individuals, when looking to the future, may be overly confident and optimistic about potential gains.
9. **Too much choices:** Given too much choice ends up in no decisions made at all.
10. **Herd instinct and competition:** Following the trend of others.

## 7.2 Indifference curves and budget lines

### Syllabus 7.2 >

- Meaning of an indifference curve and a budget line
- Causes of a shift in the budget line
- Income, substitution, and price effects for normal, inferior, and Giffen goods
- Limitations of the model of indifference curves

### Cardinal v.s. Ordinal Utility

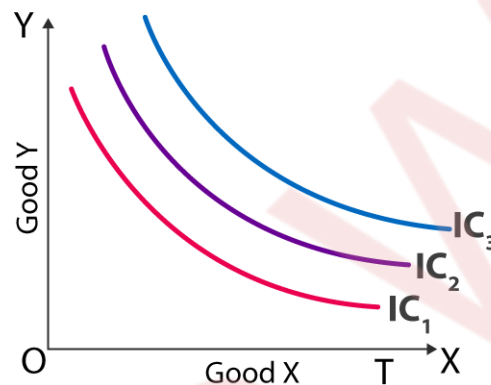
- **Cardinal utility** assumes that people could assign absolute, **meaningful utility numbers** to their satisfaction.

- **Ordinal utility** is the measuring of preferences through **ordering of satisfaction** of different types of goods rather than assigning numbers to them.

## Indifference Curve

### Indifference Curve Definition

- A curve showing **all possible combinations** of two goods that give a consumer **equal satisfaction**.
  - Every point on the curve gives the consumer **same utility**, so they are **indifferent** to the curve
- There are an **infinite** number of indifference curves in the indifference map, and each person's indifference map is **unique** to that person.



Indifference Map

## Marginal Rate of Substitution

### Marginal Rate of Substitution Definition

- The rate at which an individual is willing to exchange one good (y) in return for more of another good (x), leaving the individual at the same level of utility.

$$MRS = \left| \frac{d_y}{d_x} \right| \text{ of the indifference curve} = - \frac{\Delta Q_y}{\Delta Q_x}$$

- **Consumer Preferences** are reflected through the MRS.
  - E.g., when advertisement of Good X increases, the MRS might become steeper because people now are willing to give up more quantities of good Y for buying good X.

## Assumptions

- **More is better than less** (Goods do not have a negative marginal utility).
- **Preferences or indifferences of a consumer are transitive.**
  - If A is preferred to B, and B is preferred to C, then A is preferred to C.
- **Diminishing marginal rate of substitution.**
- **Rational** behavior of the consumer.
- **Individuals** can state their preference of one good over another (Utility is **ordinal**).
- Goods consumed are **substitutable**.



## Properties

### 1. Indifference curves slope **downward to the right**.

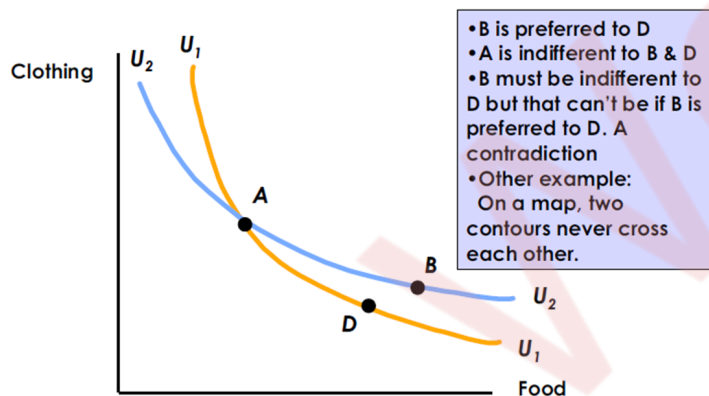
- **Assumes** "more is better":
  - Increasing the amount for good X will decrease the amount for good Y so that the level of satisfaction remains the same.

### 2. Indifference curves are **convex to the origin**.

- **Assumes** diminishing marginal rate of substitution:
  - As you get more of goods X, an individual will give up fewer of goods Y in order to exchange them for goods X.

### 3. Indifference curves **cannot intersect each other**.

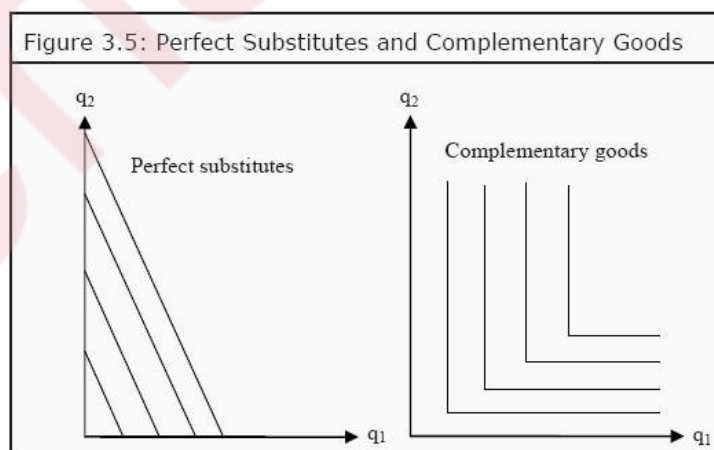
- **Assumes** transitivity:



### 4. A higher indifference curve represents a **higher level of satisfaction** than a lower indifference curve.

## Special indifference curves

- **Perfect substitute:** Constant marginal rate of substitution.
- **Perfect complements:** An increase in the amount of good  $q_1$  won't increase the overall satisfaction, if there isn't an increase in the amount of good  $q_2$ .



## Budget Line

### ☰ Budget Line Definition

- A line shows **all the different combinations of two goods** that an individual can buy **given his income** and the **prices of two goods**.
- The budget line shows **budget constraint**.

$$P_x \times Q_x + P_y \times Q_y = M,$$

- where  $P$  is the price,  $Q$  is the quantity, and  $M$  is the income.

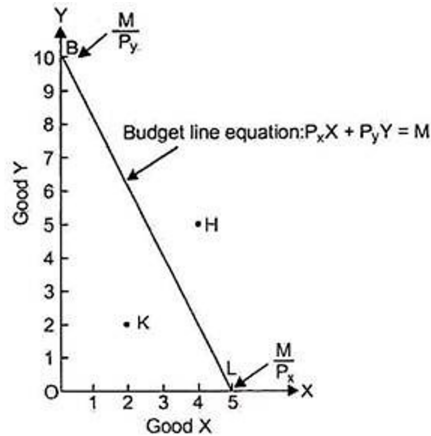


Fig. 8.14. Budget Line

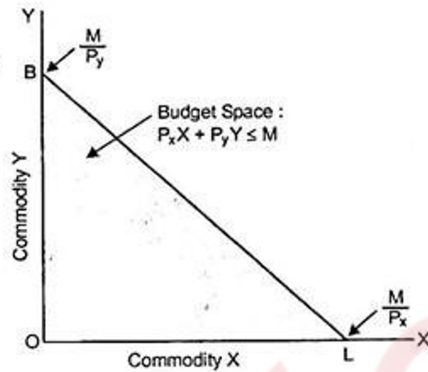


Fig. 8.15. Budget Space

### Budget Space

- A set of all combinations that can be purchased by spending **all or part** of the given income.

$$P_x \times Q_x + P_y \times Q_y \leq M$$

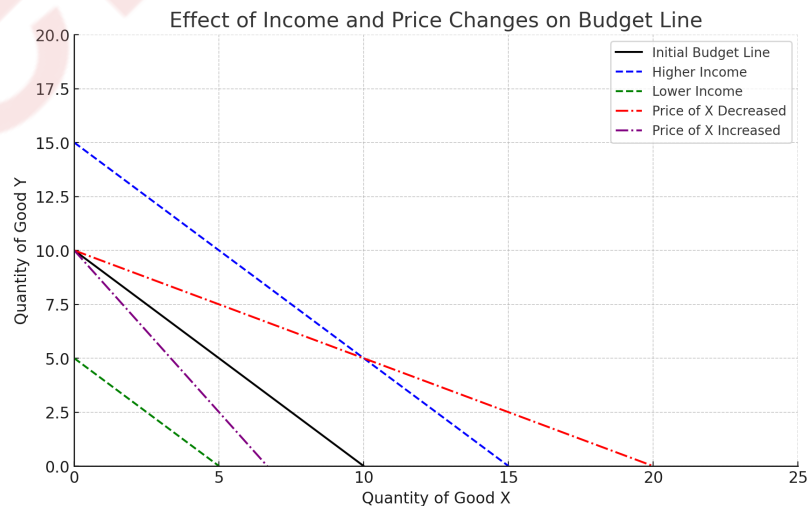
### Slope of budget lines

- The **relative price** of X to Y.

$$\text{Slope} = -\frac{P_x}{P_y}$$

### Impact on budget lines

1. **Change in income:** Shift the budget line outwards or inwards, as consumers will have more money to purchase both good X and Y.
2. **Change in price:** Rotates the budget line, as either  $\frac{M}{P_x}$  or  $\frac{M}{P_y}$  increases.

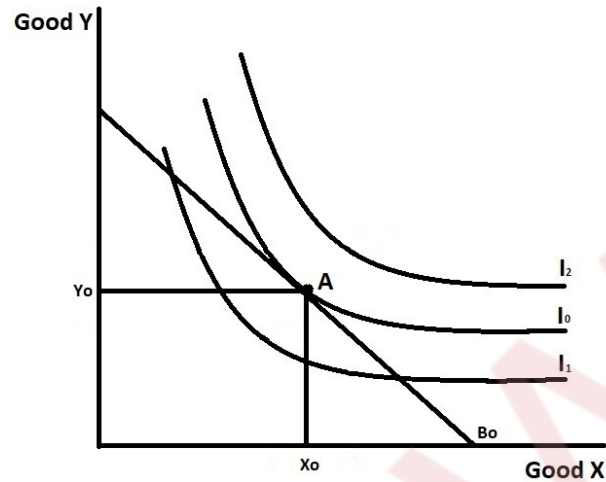


## Consumer Choice Theory

- **Consumer Choice:** The combination of *consumer preferences* and *budget constraint*.

### Consumer Equilibrium

- When a consumer with a given income and prices buy a combination of goods which give him the **maximum satisfaction**.
- It is where the budget line is **tangent** to an indifference curve.



- When the two curves are **tangent** to each other,

$$-\frac{dy}{dx} = -\frac{P_x}{P_y}$$

$$-\frac{\Delta Q_y}{\Delta Q_x} = -\frac{P_x}{P_y}$$

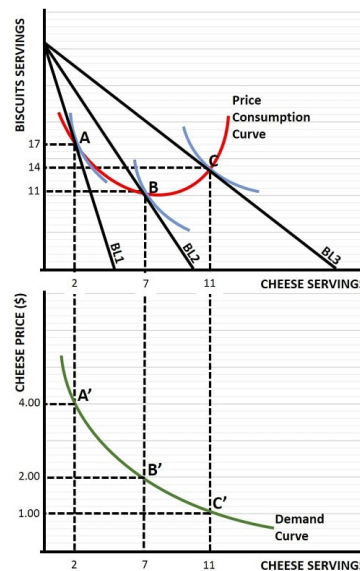
$$\therefore MU_x \times \Delta Q_x = MU_y \times \Delta Q_y$$

$$\therefore -\frac{\Delta MU_x}{\Delta MU_y} = -\frac{P_x}{P_y}$$

$$\frac{\Delta MU_x}{P_x} = \frac{\Delta MU_y}{P_y}$$

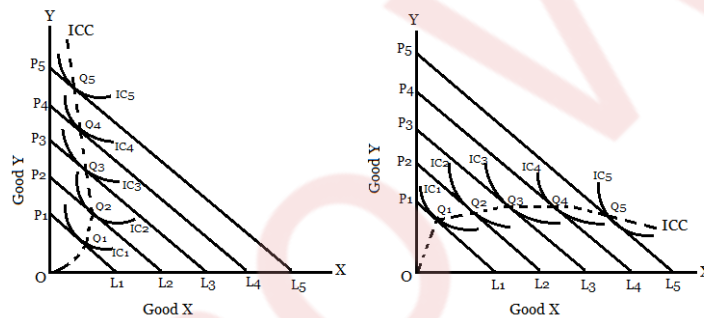
### Price Consumption Curve

- Any point on the PCC indicates the **equilibrium** position of the consumer under the price effect.
- Assumes both good X and Y are **normal** goods.



### Income Consumption Curve

- Any point on the ICC indicates the **equilibrium** position of the consumer under the income effect.



### Substitution and Income Effect Explanation

- When there is a change in price, it can be broken down into:
  - Income effect:** Change in quantity due to a **change in real purchasing power** when price changes.
  - Substitution effect:** Change in quantity due to a **change in their relative prices** with the **level of utility** constant.

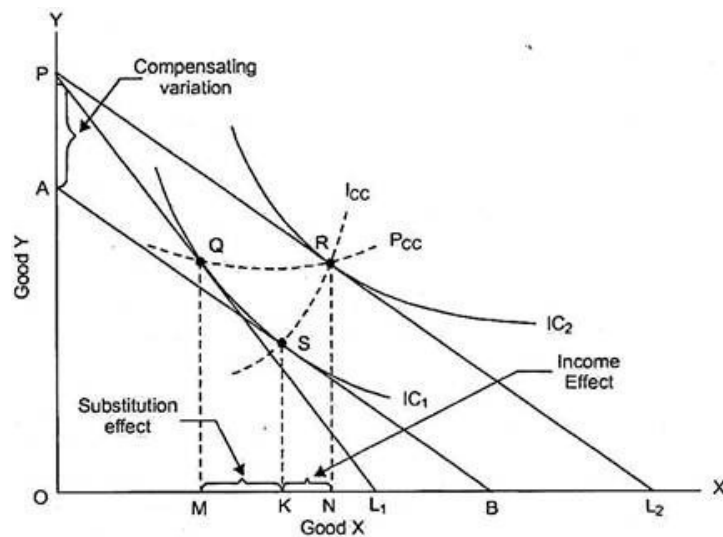


Fig. 8.36. Price Effect Split up into Substitution and Income Effects through Compensating Variation Method

### Graph Drawing

- **Substitution Effect:**

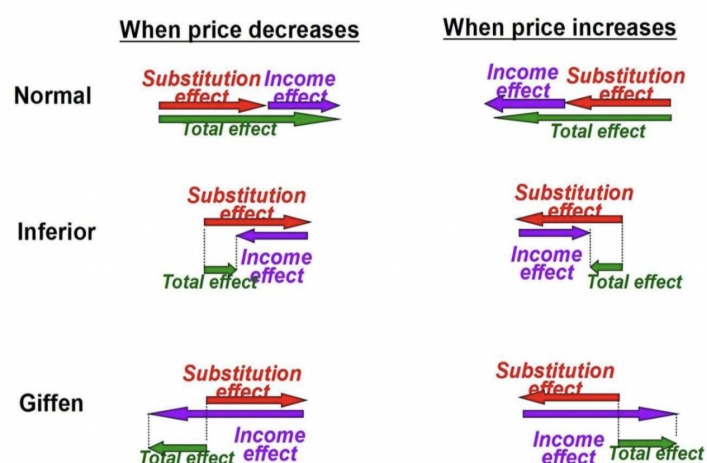
1. When price of  $X$  falls, to isolate the income effect, we adjust the income of the consumer so as to **offset the change in satisfaction** and bring the consumer back to his original indifference curve.
  - This **reduction in income** is called **compensating variation in income**.
2. Hence, the budget line will rotate to  $AB$ . When  $X$  is being relatively cheaper than before, a new equilibrium  $S$  will be reached as the consumer wishes to maximize his profit.
3. This movement represents the **substitution effect**, contributing the change of quantity from  $OM$  to  $OK$ .

- **Income Effect:**

1. When price of  $X$  falls and as a result budget line shifts from  $PB$  to  $PL_2$ , the real income of the consumer rises (he can buy more of both goods with the same income).
  2. The new equilibrium is set at point  $R$  on a higher indifference curve  $IC_2$ , and thus gains in satisfaction as a result of fall in price of good  $X$ .
  3. Hence, the income effect contributes the quantity change from  $OK$  to  $ON$ .
- Therefore, price effect is the combined result of a substitution effect and an income effect.

- **Different types of goods:**

- **Normal good:** SE and IE goes on the same direction.
- **Inferior good:** IE opposite to SE, but with a smaller magnitude.
- **Giffen good:** IE opposite to SE but with a larger magnitude.



### Giffen Goods Example

- Assume rice is a **staple food** and makes up a large part of a family's diet.
  - If the price of rice **increases**, the family can no longer afford more expensive foods like meat or vegetables.
  - As a result, they **cut back on those luxury items** and buy **even more rice** to meet their calorie needs.
  - Thus, the **quantity demanded for rice increases** despite its price rising.

### Limitations of Indifference Curves

- Consumers may not be able to **compare satisfaction of 2 goods**.
  - There are many biases leading to different satisfactions.
- Indifference curves assume that consumers **act rationally**.
- Indifference curve is unable to explain goods which are purchased **infrequently** with no consistent trade off against another good.

## 7.3 Efficiency and market failure

### Syllabus 7.3 >

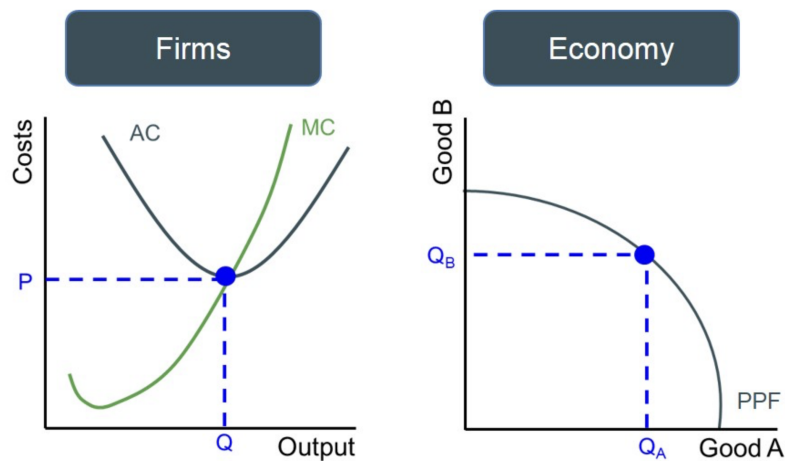
- Definitions and conditions of productive efficiency and allocative efficiency.
- Pareto optimality
- Definition of dynamic efficiency
- Definition and reasons for market failure

### Economic Efficiency

- Economic Efficient:** When the **greatest possible level** of infinite wants is being met with those scarce resource.
- When both *productive efficiency* and *allocative efficiency* co-exist, the best possible use is being made of scarce resources.

### Productive Efficiency

- Firms produce at **the lowest possible cost**.
  - When the **maximum amount of product** is produced based on the resources available.



- **Competition** leads to productive efficiency in the long run, as firms have to cut its cost to remain competitive.
- It is where Price = Minimum AC.

### Allocative Efficiency

- Firms produce a combination of goods and services that are **most wanted by consumers**.
  - Gives consumer maximum satisfaction with their current income.
- It occurs when **marginal cost** equals **marginal benefit (price)**.
  - It is where Price = MC.
  - Since the society values the last unit of the good as much as it costs to produce it.
- **Competitiveness** leads to allocative efficiency:
  - Firms want to maximize their profits, so will produce products with the highest demand.
  - Firms are **price-takers**, so still need to control their prices.

### Pareto Optimality

- The situation where **no** re-allocation of resources can make an individual better off **without making some other individuals worse off**.
  - **Pareto improvement**: When a change in the allocation of resources **harms no one** and **benefits at least one person**.
- Any point on the PPC is at **pareto optimality**, as it is impossible to increase the production of consumer goods without decreasing the production of capital goods.
- Any point within the PPC is not at **pareto optimality**.

### Dynamic Efficiency

- The optimal allocation of resources over time, focusing on the ability of an economy or a firm to improve its **productive capacity** through **innovation and technology**.
- It is a **long-run, qualitative** concept.

### Market Failure

- The situation where a **pure free market** fails to **allocate resources efficiently**, leading to **social welfare not being maximized**.



## Causes of market failure

- Externalities in the market.
  - The external cost/benefit is not revealed by its market price.
- The provision of merit and demerit goods.
- The provision of public and quasi-public goods.
- Information failure.
- Adverse selection or moral hazard.
- Abuse of monopoly power in the market.

## 7.4 Private costs and benefits, externalities and social costs and benefits

### Syllabus 7.4 >

- Definition of calculation of SC, PC, EC, MSC, MPC, MEC, SB, PB, EB, MSB, MPB, MEB.
- Definition of positive externality and negative externality.
- Positive and negative externalities of both consumption and production.
- Deadweight welfare losses arising from positive and negative externalities.
- Asymmetric information and moral hazard.
- Use of costs and benefits in analyzing decisions.

## Externalities

- The **effect**, negative or positive, on a **third-party** who has **no involvement** in the action that has caused the externality.
  - **Negative externality**: Damages to the third parties.
  - **Positive externality**: Benefits to the third parties.

## Types of Costs and Benefits

### Private Costs (PC) and Private Benefits (PB)

- The costs/benefits obtained by the entity who produces/consumes a product.
  - *Private costs*:
    - Firms' production costs.
    - Consumers' consumption costs.
  - *Private benefits*:
    - Firms' revenues.
    - Consumers' utility.

### External Costs (EC) and External Benefits (PB)

- The costs/benefits obtained by the **third-parties** who is not involved in action.
  - *External costs*:
    - Production that emits hazardous chemicals.
    - Consumption of cigarettes.
  - *External benefits*:

- Production of disease vaccines.
- Consumption of vaccines.

### Social Costs (SC) and Social Benefits (SB)

- The sum of private costs/benefits and external costs/benefits.
  - Social Costs = Private costs + External Costs
  - Social Benefits = Private Benefits + External Benefits

### Externalities in Economy Activities

- **Supply curve** is equivalent to the **marginal private cost curve**.
  - $\therefore$  Marginal private cost = Minimum price producers are willing to accept
- **Demand curve** is equivalent to the **marginal private benefit curve**.
  - $\therefore$  Marginal private benefit = Marginal utility = Price

### Deadweight Welfare Loss

- The shaded area  $xyz$  in the following diagrams.
- It represents the **efficiency loss** that is not compensated by any form of benefits, i.e., tax, money, surplus, etc.

$$\text{Deadweight Loss} = \left| \int_Q^{Q_1} \text{Marginal Loss}(q) dq \right|$$

- Where,  $q$  is the quantity,  $Q_1$  is the original equilibrium output,  $Q$  is the new equilibrium output, and, in case of externalities:

$$\text{Marginal Loss}(q) = \text{MSC}(q) - \text{MSB}(q)$$

- It is a loss in **allocative efficiency**.
- By integrating from  $Q$  to  $Q_1$ , we calculate the accumulated marginal loss in efficiency switching from the old equilibrium to the new one, resulting in the **total loss** in efficiency.
- Since the curves are linear, the deadweight loss can be simplified as:

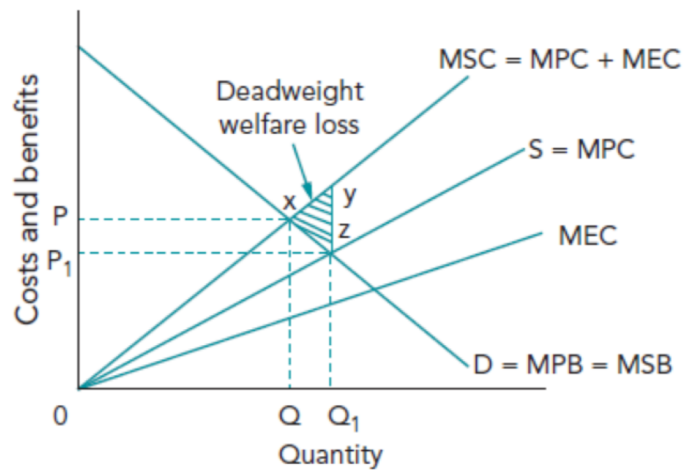
$$\text{Deadweight Loss} = \left| \frac{1}{2} (Q_1 - Q) \text{MEC}(Q_1) \right| \text{ for negative externalities}$$

$$\text{Deadweight Loss} = \left| \frac{1}{2} (Q_1 - Q) \text{MEB}(Q_1) \right| \text{ for positive externalities}$$

- It is **the net loss in total surplus (CS + PS)**.
  - Because allocative efficiency occurs when the total surplus is maximized.

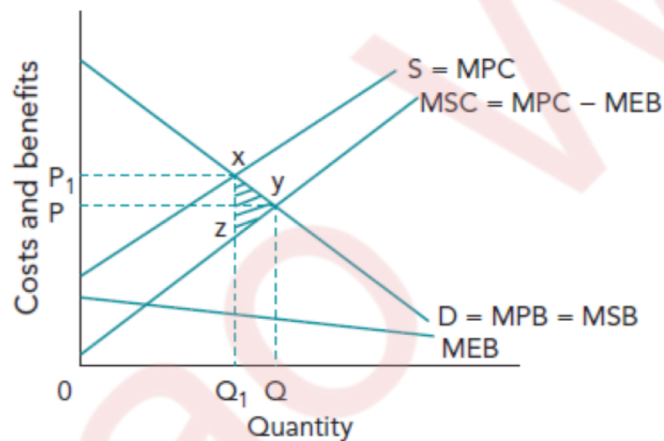
### Negative Production Externalities

- The **social optimum output** is at  $Q$ , where  $\text{MSC} = \text{MSB}$ .
- The **actual output** is at  $Q_1$ , where  $\text{MPC} = \text{MPB}$ .
- Hence, there is an **over-production** of  $Q_1 - Q$ .



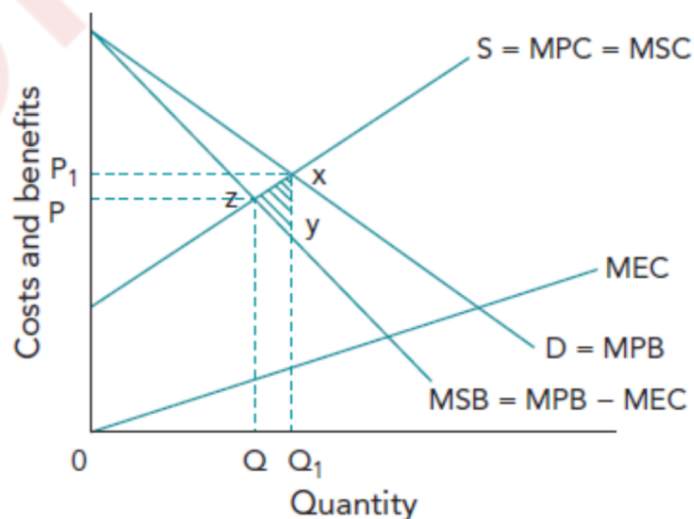
### Positive Production Externalities

- The **social optimum output** is at  $MSC = MSB$ , where  $MSC = MPC - MEB$ .
  - $MSC$  doesn't necessarily start from the origin.
- The **actual output** is at  $MPC = MPB$ , and hence an **under-production** occurs.



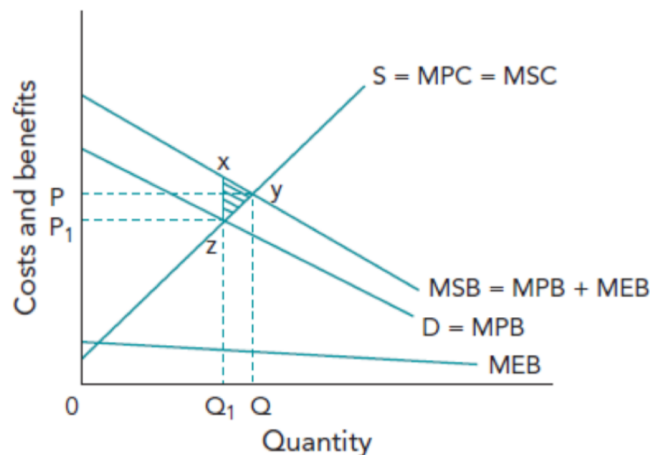
### Negative Consumption Externalities

- The slope of  $MEC$  depends on the nature of the good.
- $MSB = MPB - MEC$ , and there is an **over-consumption**.



### Positive Consumption Externalities

- The slope of  $MEB$  depends on the nature of the good.
- $MSB = MPB + MEB$ , and there is an **under-consumption**.



### Asymmetric Information and Moral Hazard

- **Asymmetric Information:** When one party in the market has **more information** than the other party.
  - When sellers have more information: E.g., second-hand car dealers.
  - When customers have more information: E.g., borrowing money.
- **Adverse Selection:** When one party in **transaction** has more or better information than the other party.
- **Moral Hazard:** When one party takes on more risk because they **do not bear the full consequences of that risk**.
  - E.g., A man with insurance is more likely to carry out risky behavior → leading to the failure to achieve the most economically efficient behavior.

### Cost and Benefit Analysis

- An **appraisal technique** used by **government** to help with decision making.
- **Long** and **Wide** view:
  - **Long:** Happens in a lengthy time frame.
  - **Wide:** Takes into consideration the full social costs and social benefits, much wider than a financial appraisal.
    - Hence, some projects refused by financial appraisal may be carried on
- **Shadow price:** Prices used for costs and benefits where no market price is available; e.g., the travel time savings.
- Government will pursue a project when the **net social benefit** is **maximized**.

### Stages of CBA

1. **Identification** of all relevant costs and benefits.
  - Identify private costs & benefits, external costs & benefits.
  - **Difficulties:**
    - Costs and benefits are controversial.
    - Hard to set a boundary for spillover effects.
2. Putting a **monetary value** on all relevant costs and benefits.

- **Difficulty:** Shadow prices are sometimes **subjective**.
3. **Forecasting** future costs and benefits (where applicable).
    - **Difficulty:** Forecasts are sometimes based on crude models.
  4. **Decision making** - the interpretation of the results from Cost-benefit analysis.

## 7.5 Types of cost, revenue and profit, short-run and long-run production

### Syllabus 7.5 >

- Short-run and long-run production and cost functions
- Relationship between economics of scale and decreasing average costs
- Internal and external economies of scale
- Definition and calculation of revenue, average, and marginal revenue
- Definition of normal, subnormal, and supernormal profit
- Calculation of supernormal and subnormal profit

### Short Run Production Functions

- **Short Run:** When there is **at least one** **fixed** factor of production.

#### Total Product

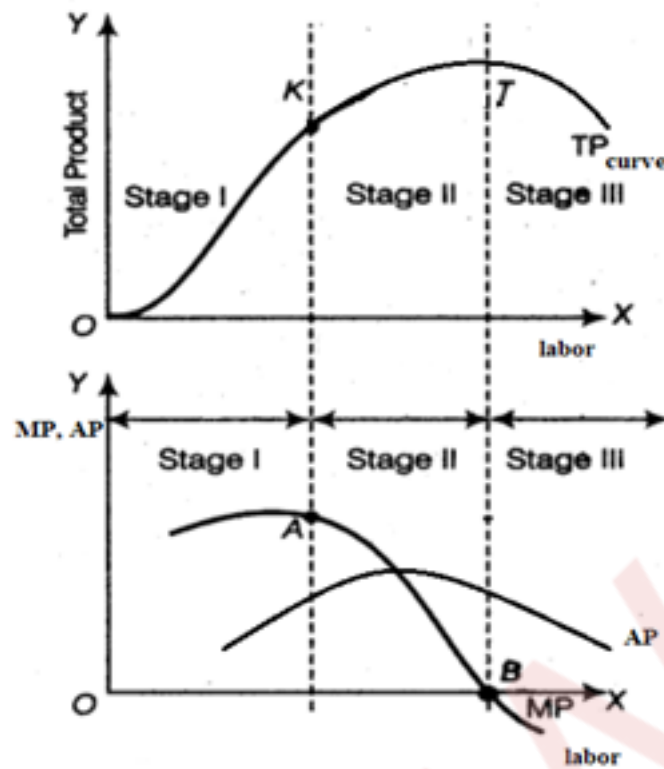
- The **maximum possible output** from a given set of **factor inputs**.

#### Marginal Product

- The **change in total product** as a result of **a change in input**.

$$MP = \frac{\Delta TP}{\Delta Q \text{ of FOP}}$$

### Relationship between short run production functions



## The Law of Diminishing Marginal Returns

### ☞ The Law of Diminishing Marginal Returns

- As more units of a variable input (like labor) are added to a fixed input (like land or machinery), the additional output produced by each new unit **eventually decreases, after a certain point.**

- It's a **short-run** phenomenon.
  - It occurs due to a **bottleneck** of fixed factors → hence, only SR.

## Short Run Cost Functions

- Variable Costs:** costs changed with change in output.
- Fixed Costs:** costs unchanged with change in output, in the SR.

### Total cost

- Total Fixed Cost (TFC)*
- Total Variable Cost (TVC)*
- Total Cost (TC = TFC + TVC)*

### Average Cost

- Average Fixed Cost (TFC / Q)*
- Average Variable Cost (TVC / Q)*
- Average (Total) Cost (TC / Q = AFC + AVC)*

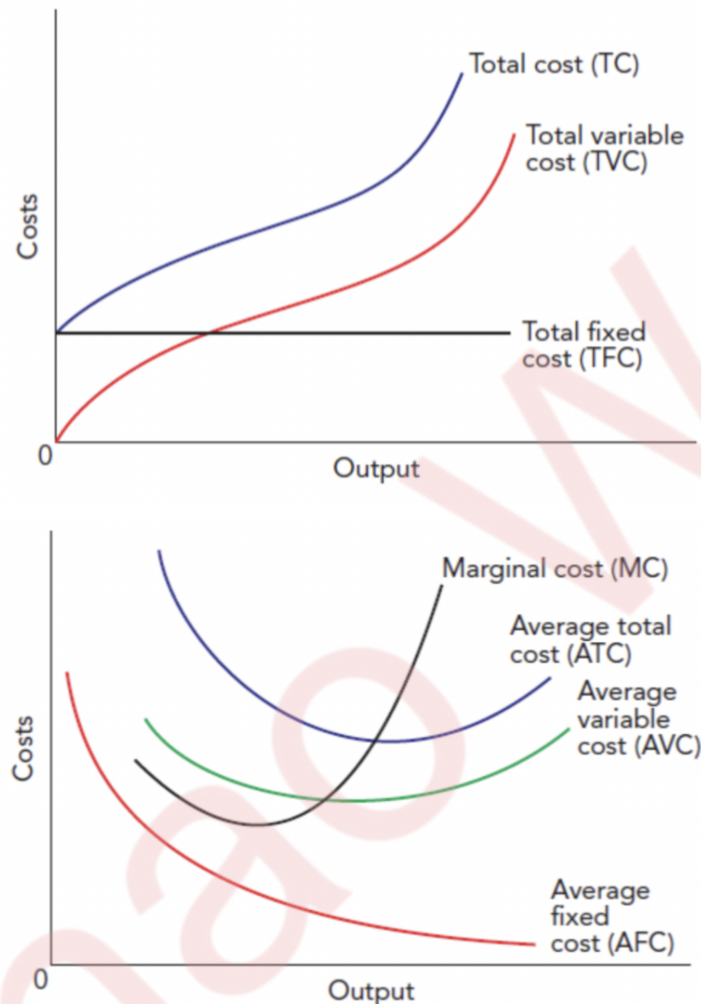
### Marginal Cost

- Marginal Cost =  $\Delta TC / \Delta Q$*

## Relationship between short run cost functions

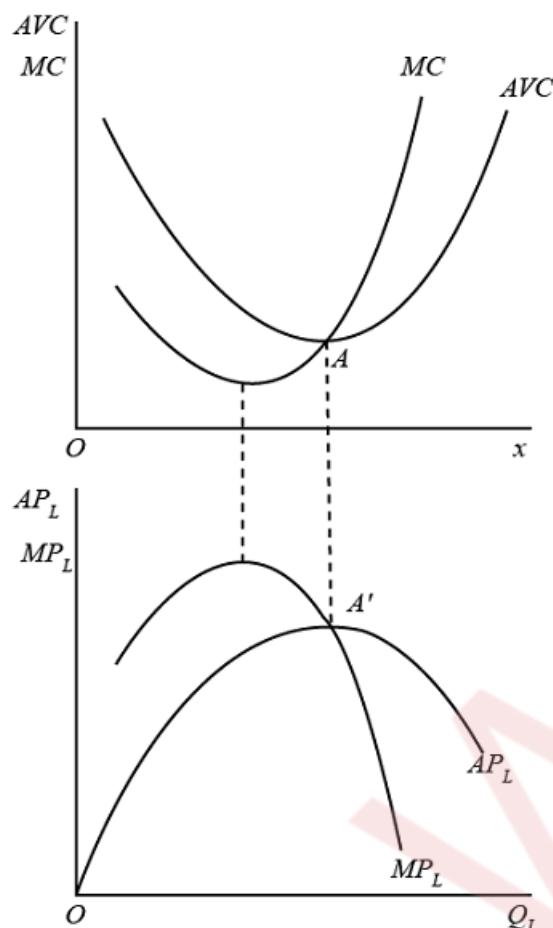
### Example

- **Average costs** and **marginal costs** use two different axis systems.
- At unit  $i$  on the x-axis:
  - Average costs mean the total costs divided by  $i$ .
  - Marginal costs mean additional cost if we produce the  $i$ th unit.



- ATC initially **decreases** because:
  - Specialization & division of labour.
  - The average fixed cost (AFC) is falling.
- ATC then **increases** because:
  - **Diminishing marginal returns** set in when the quantity is at the lowest point on the MC.
  - Increasing cost from diminishing marginal return outweighs the factors that cause AC to decrease.
- AVC tends to ATC as output rises → because AFC tends to zero the greater the output.
- MC curve will always cut the AVC curve at the lowest point.
  - Because AVC will only increase when MC is greater than it.
  - At point  $i$ ,  $AVC_i = \sum^i MC \rightarrow MC$  is the additional cost to TVC if the additional unit is produced.





The Unique Relationship between Production Cost curves

- Product curves are **mirror images** for cost curves.
  - Because as marginal product decreases, more inputs are required for the same amount of output, and therefore higher prices.
  - It **assumes** that there are **constant factor costs per unit**.

### Long Run Production Functions

- In the long run, firms can increase all its factors of production → so they can increase the **scale of production**.
- The long run production functions shows the relationship between the output where **all factor inputs are variable**.
  - Therefore, the Law of Diminishing Marginal Return doesn't fit here.

#### ☒ Cost Minimalization of Resource Employment

Given the cost of the factors of production, the **minimum cost of production** can be arrived at where:

$$\frac{MP_{\text{factor a}}}{P_{\text{factor a}}} = \frac{MP_{\text{factor a}}}{P_{\text{factor a}}} = \frac{MP_{\text{factor a}}}{P_{\text{factor a}}} = \dots$$

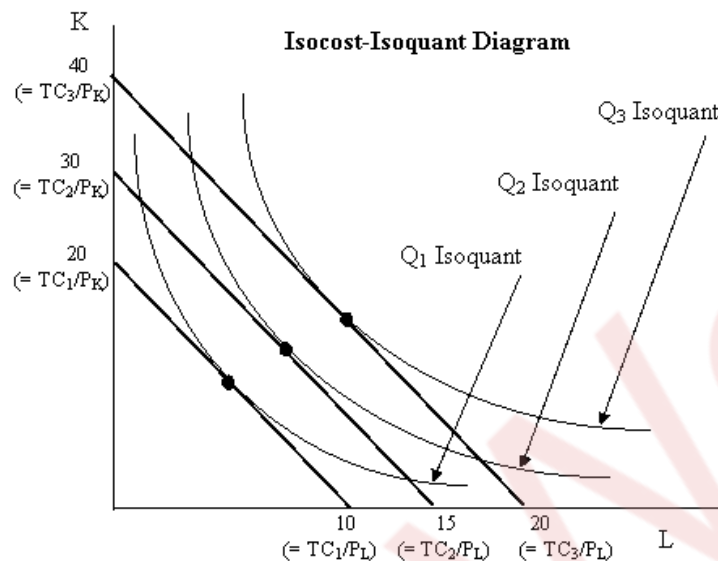
### Isoquant-Isocost Analysis

- **Isoquant curves:** Represents different combinations of inputs (like labor and capital) that produce the same level of output.

- **Isocost lines:** Represents all combinations of inputs that cost the same amount to the firm,

$$C = wL + rK$$

- where  $w$  the wage rate,  $L$  the quantity of labor,  $r$  the rental rate,  $K$  the quantity of capital, and  $C$  the total cost.



- The most **least-cost** production combination is achieved at the **tangency** of the isoquant and isocost curves.
  - Joining all the tangential points signifies the **expansion path**, or the **long-run production function** of the curve which helps plan the expansion.

#### Limitations

- **Difficult** to determine the isoquants.
- **Assume** that in the long run, **factors can be easily switched**, which is not always the case.
- **Assume constant** wage and rental rates.

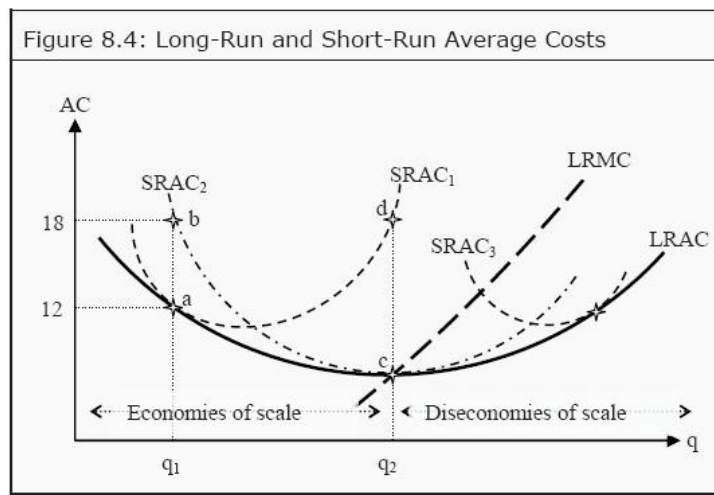
#### Returns to scale

- Measures the **change in output** for a **given proportional change** in **all inputs**.
- **Increasing returns to scale:** increase in quantity of factors inputs leads to a **greater-than-proportionate** increase in output.
- **Decreasing returns to scale:** increase in the quantity of factor inputs leads to a **smaller-than-proportionate** increase in output.
- **Constant returns to scale:** increase in the quantity of factor inputs leads to an **equal-to-proportionate** increase in output.

#### Long Run Cost Functions

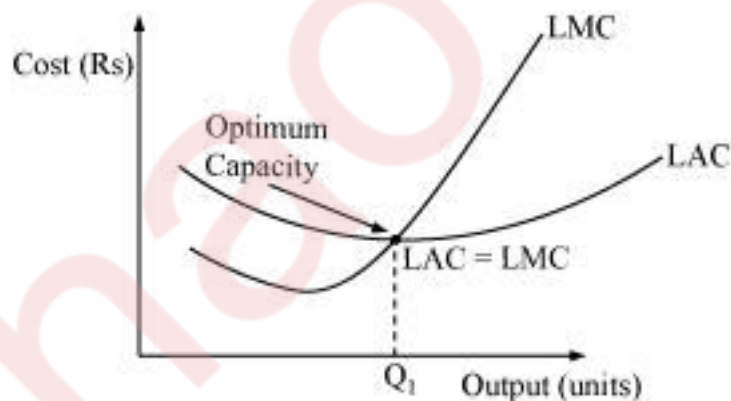
- In the long run, firms are subjected to economies or diseconomies of scale.

#### Long run average cost curve



- LRAC is made up of **tangency points** to SRAC curves at different quantities, not the **minimum point** of each SRAC.
  - It is a **envelope curve**.
- LRAC shows the firm's **lowest cost per unit** at each level of output.
  - So at every output level, the firm is **productively efficient**.
- A **diseconomies of scale** happens when the LRAC is sloping upwards, an **economies of scale** happens when the LRAC is sloping downwards, and a **constant returns to scale** happens when the LRAC has zero slope.

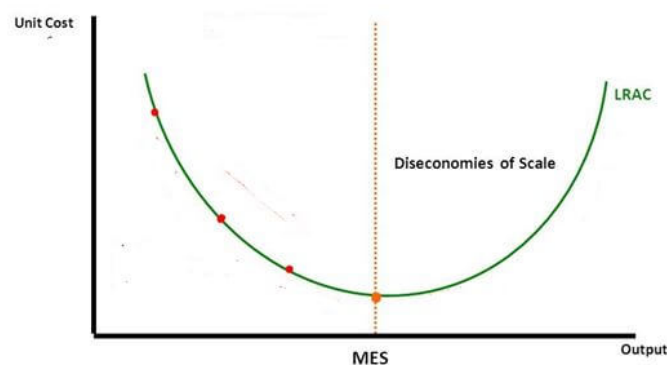
#### Long run marginal cost curve



- After the optimum capacity, **diseconomies of scale** is reached.

#### Minimum Efficient Scale (MES)

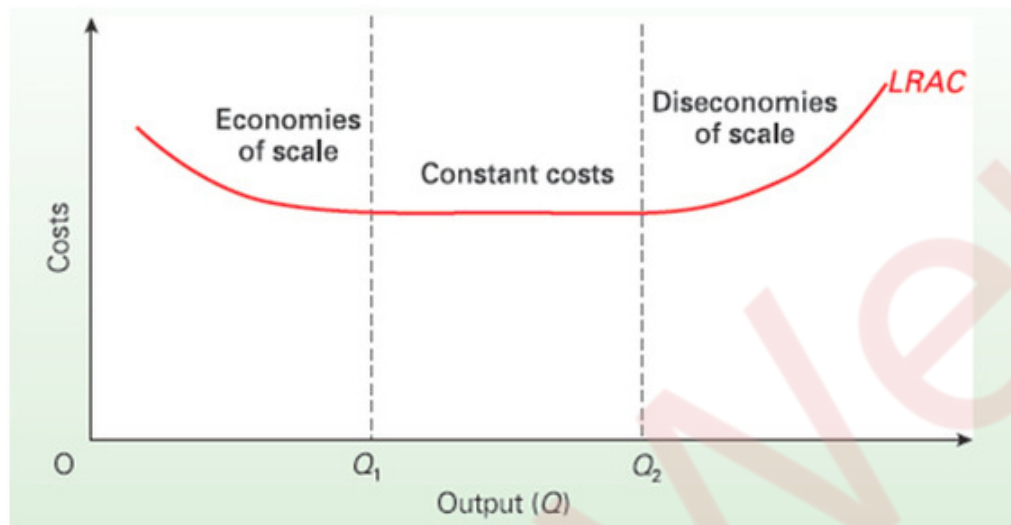
#### Long Run Average Cost (LRAC)



- The situation where a firm is producing at its **optimum output** in the short run, and the **lowest average cost** in the long run has **maximized its efficiency**.

## Internal Economies of Scale

- The **long run cost advantage** gained related to the **business itself** from an **increase in size/output**.



## Types of Internal Economies of Scale

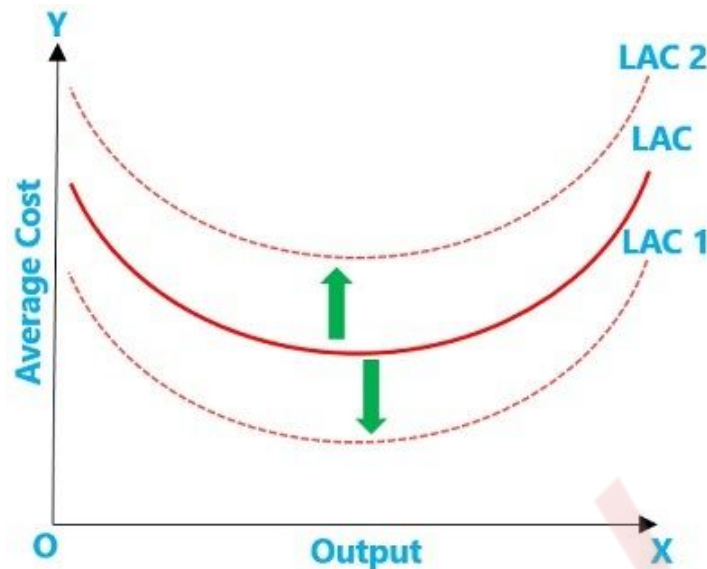
1. **Technical:** Lower unit costs from **more efficient techniques** in the production process, e.g., efficiency of larger machines.
2. **Purchasing:** Buying in **bulk** usually receives discounts.
3. **Marketing:** Scale allows firms to purchase more effective form of **advertising**, and discount exists for buying ads in large quantities.
4. **Managerial:** Scale helps afford **specialist staff**.
5. **Financial:** Borrow at a cheaper cost, and easier to earn credits.
6. **Technological:** Scale helps afford efficient but high-cost technology.
7. **Economies of Scope:** Large firms producing a range of products can share costs, e.g., lawyers & distribution channels.

## Technical Economies of Scale Explained

- **Container principle:** Bigger operations lead to lower costs per unit because the fixed costs spread over a larger volume of production.
- **Greater efficiency of large machines:** Larger machines can produce more output with the same input.
- **Specialization:** Employees can be more specialized in larger operations.
- **Multi-stage production:** Save time and cost moving semi-finished products from one stage to another.
- **Principle of multiples:** Large firms can use more than one machine of different sizes and capacities, matching each machine to the specific task at hand.
- **Indivisibility:** Some machines cannot be divided into smaller parts to do smaller jobs.

## External Economies of Scale

- The **long run cost advantage** gained related to **whole industry** when the industry increases in size.



### Types of External Economies of Scale

1. **Skilled labor in the area:** Lower cost to hire skilled labors.
2. **Improved reputation of the area:** E.g., Silicon Valley.
3. **Attracted suppliers:** specialist suppliers, services, and exchange markets again lower the cost.
4. **Improved infrastructure:** Better road, better transportation system, better policing, etc.

### Internal Diseconomies of Scale

- The **disadvantages** of large-scale production that can lead to **increasing average costs**.

### Types of Internal Diseconomies of Scale

1. **Managerial problems:** Loss of management efficiency such as overpaying of resources resulted from administrative deficits.
2. **Communication problems:** Communication overheads between departments, divisions, etc.
3. **Motivational problems:** Demotivation since individuals are less recognized in large companies.
4. **Co-ordination problems:** It is harder to co-ordinate between departments, resulting in costs.
5. **Principal-agent problem:** Divorce of ownership and control (The CEO is not the board chairman) results in misaligned incentives, delays, monitoring costs, etc.

### External Diseconomies of Scale

- The **disadvantage** from an industry growing too large that can lead to **increasing average costs**.

### Types of External Diseconomies of Scale

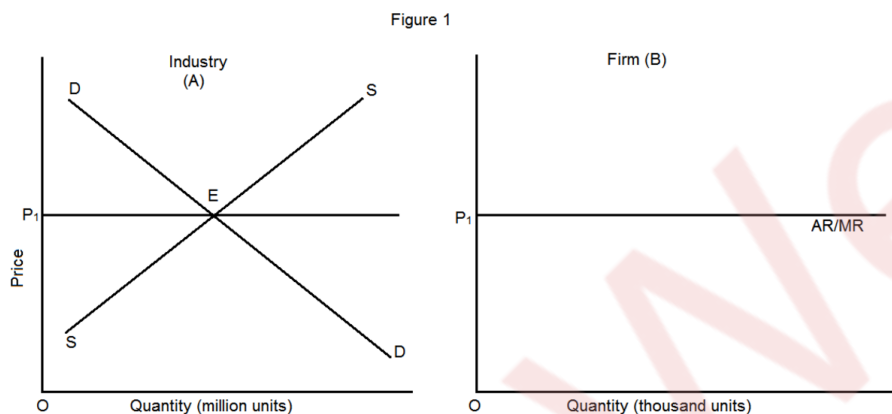
1. **Congestion:** Increased journey times and transport costs in an area.

2. **A rise in cost of input factors** in the area due to increasing demand on the factors.

## Revenue and Profit

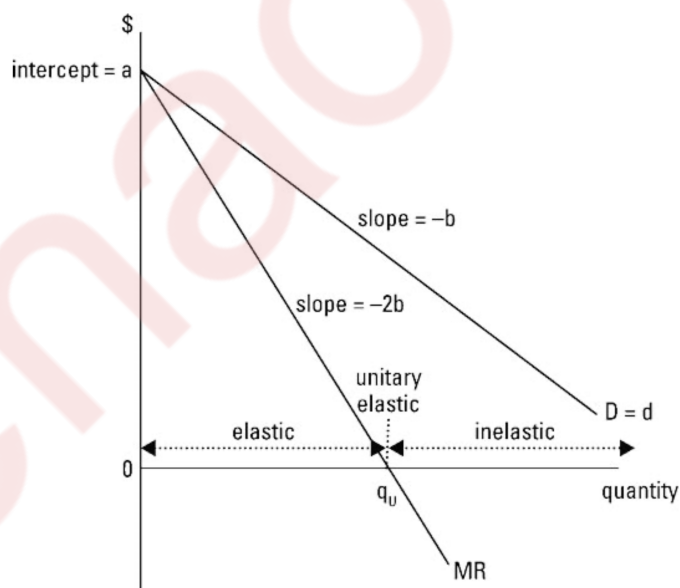
- **Total Revenue** =  $P \times Q$ .
- **Average Revenue** = Total Revenue /  $Q$ .
- **Marginal Revenue** =  $\Delta TR / \Delta Q$ .
- **Total Profit** =  $TR - TC$ .

## Revenues of a price-taking firm



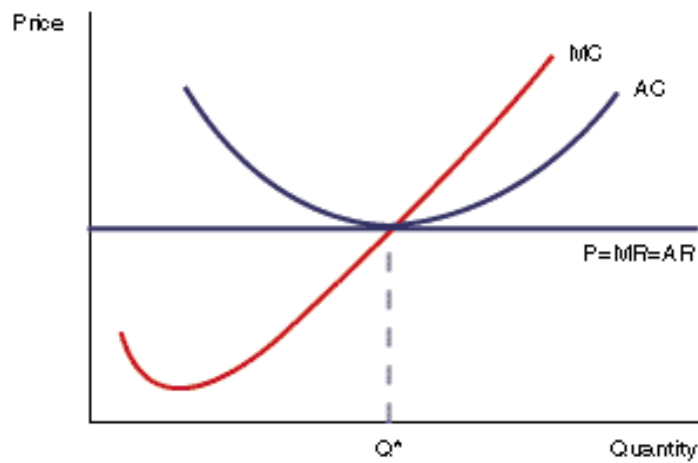
- Price = Average Revenue (AR) = Marginal Revenue (MR)

## Revenues of a price-making firm



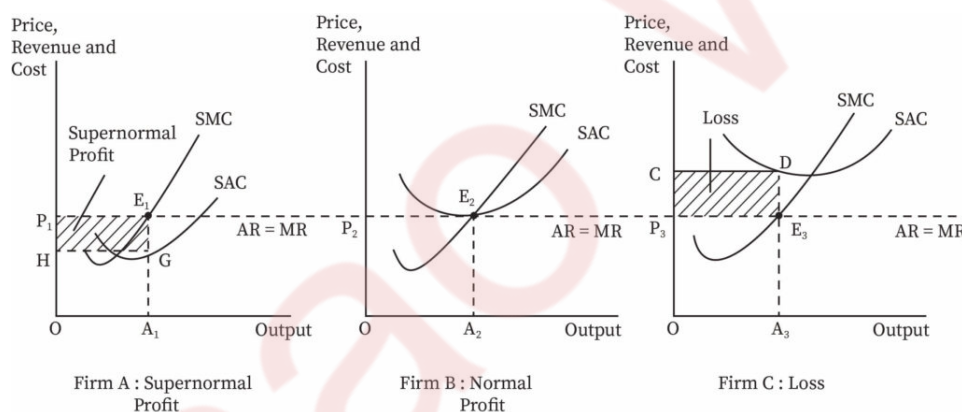
- The MR curve is always **half** the distance to the AR curve along the x-axis.

## Profit Maximization



- Profit is maximized when the difference between total revenue and the total cost is at its greatest.
  - Where the **marginal cost** curve cuts the **marginal revenue** curve.
    - Because marginal cost curve is an increasing function initially smaller than the revenue curve.

### Types of profits



- Normal profit:** The **minimum level of profit** that a firm needs to earn to remain in business in the long run. The situation where a firm is covering all its **opportunity costs**, including both explicit and implicit, but is **not making any extra profit** beyond that.
  - Opportunity costs covered & Zero economic profit.*
- Subnormal profit / Loss:** Profit **less** than normal profit.
- Supernormal / Abnormal profit:** Profit **in excess** of normal profit.

### Calculation of profits

$$\begin{aligned}\text{Total Costs} &= \text{Explicit Costs} + \text{Implicit Costs} \\ \text{Profit} &= \text{Total Revenue} - \text{Total Costs}\end{aligned}$$

## 7.6 Different market structures

### Syllabus 7.6 >

- Perfect competition and imperfect competition.
- Structure of the listed markets.
  - Monopoly, monopolistic competition, oligopoly, natural monopoly.



- Barriers to entry and exit.
  - Legal, market, cost, physical.
- Performance of firms in different market structures.
- Definition and calculation of the concentration ratio.

## Market Structure Characteristics

- **Market Structure:** The way in which goods and services are supplied by firms in a particular market, describing the characteristics:
  1. **Number** of buyers and sellers.
  2. **Nature** of the products and whether they are different.
  3. **Ease of entry.**
  4. Extent to which all firms have the same information.
    - Perfect or imperfect competition.

## Barriers to Entry and Exist

- Any factors that restrict new firms from enter/exit a particular market.
  - Barriers to entry give incumbent firms the ability to fix prices.

### Types of Barriers to Entry

- **Legal Barriers:** Protected by law.
  - *Govt. regulations:* e.g., public utilities & nationalized industries.
  - *Copyright/patents:* sole rights to producers over certain IPs for a period of time.
- **Cost Barriers:** Existence of high start-up costs and economies of scale.
  - *Economics of scale:* predatory pricing.
- **Market Barriers:** Existence of brand loyalty.
- **Physical Barriers:** Existence of control of sources of supply.
- **Other barriers:** Mergers & takeovers, location, Network effects (people use a product because they know others are using it).

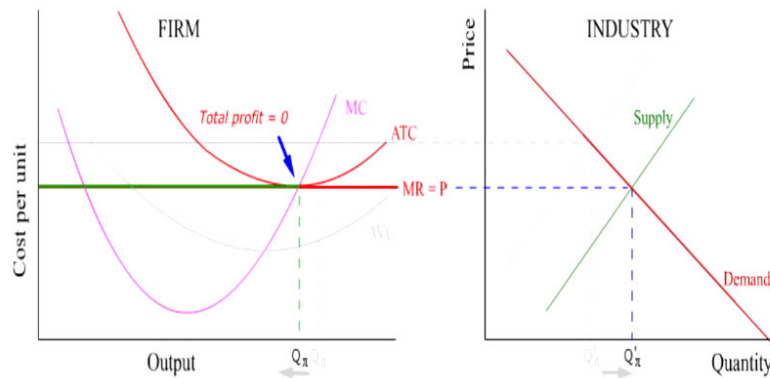
### Barriers to Exist

- Sometimes barriers to exist may act as barriers to entry.
- Examples include: High sunk costs such as advertising or purchase of expensive; Government regulations to provide guaranteed services.

## Perfect Competition

- **Assumptions:**
  - A large number of small producers & consumers.
  - All firms produce a homogeneous product → no brand loyalty.
  - Freedom of entry or exist at zero cost.
  - Perfect knowledge.
  - All factors of supply are perfectly mobile → supply elastic.
  - All firms aim to maximize their profits ( $MC = MR$ ).
- Firms are price-takers.

- The **supply curve** for a firm in perfect competition is its **marginal cost** curve because it always produces at  $MC = MR$ , and  $MR = P$ .

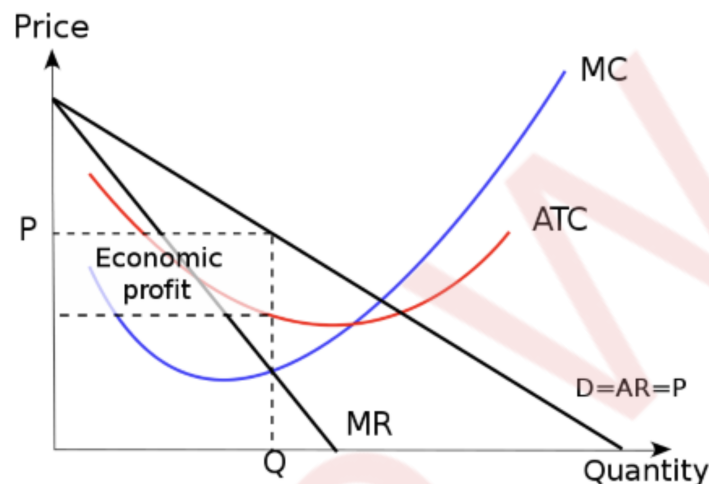


- Short run:** there may exist supernormal profits or losses.
- Long run:** the market price will always be at the **normal profit** level.
  - If a firm makes more, other firms will be attracted (free barrier to entry), increasing the supply.
  - If a firm makes less, it will exist, decreasing the supply.
- The **shut-down** point of firms:
  - $P \leq AVC$ : Stops producing in both short-run and long-run.
  - $P > AVC$ : Continues producing in short-run, but not in long-run.
    - Because the firm continues to cover its fixed costs.
  - $P \geq ATC$ : Production in both short-run and long-run.
    - At least the firm is covering its cost.
- Efficiency** of firms:
  - Productive efficiency:** In the long run, because there's only normal profit, MC cuts MR at  $ATC = AR$ , where the intersection occurs at the lowest point of ATC.
  - Allocative efficiency:** The market operates at  $MC = P$ , since  $P = MR$ .
- Evaluation** of perfect competition:
  - Pro:** Economic efficiency is achieved in the **long-run equilibrium**.
  - Con:** No improvement in **dynamic efficiency** over time.
    - $\therefore$  No economic profit for innovation.
    - $\therefore$  Perfect information means any innovation will be copied.
    - $\therefore$  Even if they innovate, they are still price-takers.
  - It is a purely theoretical market structure, used as a benchmark to test the efficiency of other real-world structures.

## Monopoly

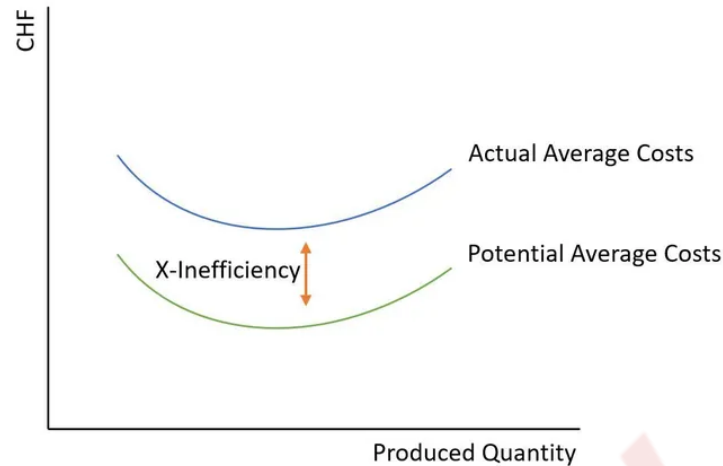
- Assumptions:**
  - Only **one firm**, but an unlimited number of buyers.
  - Substantial barriers to entry**.
  - Imperfect knowledge**.
  - No substitutes**, either **actual** or **potential**.
  - The firm aims to **maximize profits** ( $MC = MR$ ).

- **Causes:**
  - Created by authorities, e.g., licensing. (legal barrier).
  - Created by patents/copyrights (legal barrier).
  - Created by actions in the market, e.g., mass marketing (market barrier).
    - It is a **competitive market**.
  - Created by mergers and acquisitions to gain EOS (cost barriers).
- Therefore, the firm is a **price-maker**.
  - However, the firm shall **still abide by the demand curve**, yet it can freely choose to operate at any point on the curve.
  - In a monopolistic market, the AR curve is the demand curve, because the price is the same as average revenue if the firm charges the same price for all units sold.



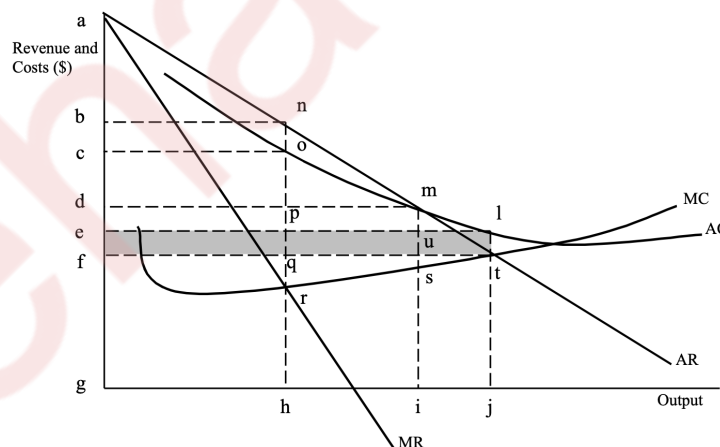
- **Short run:** The firm will produce at  $MC = MR$ , and sell at the highest price possible at this output level (right on the P curve).
  - This helps generate a **supernormal profit** of  $Q \times (AR - ATC)$ .
    - Monopolists can also make **losses** → e.g. high-cost patents.
- **Long run:** High barriers to entry exist to discourage new incoming firms, and the **supernormal profit** is **secured**.
  - No change to profit level like perfect competition.
- **Efficiency:**
  - **Productive efficiency:** **Not productively efficient**.
    - Monopolies have absolute market power, so they don't need to be productive efficient to 100% cut the costs.
  - **Allocative efficiency:** **Not allocatively efficient**.
    - Due to differentiation, they can earn more profits by setting price at average revenue instead of marginal costs.
  - **X-inefficiency:** Failure to achieve the lowest possible cost of production for a **given level of output**.
    - Arises due to **lack of incentives** to cut costs, because of:
      - Strong market power.
      - Principal-agent problem.
      - Behavioral factors (lack of motivation of staff).
  - **Dynamic efficiency:** **Dynamic efficient**.

- Monopoly will keep adapting itself to technology because it has the capital, and it still needs to obey the demand curve. The more dynamically efficiently they are, the more profit they can earn.



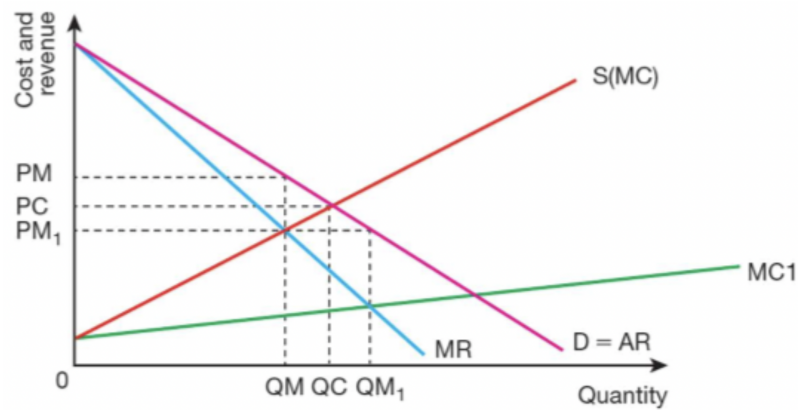
### Natural Monopoly

- Exists where it would be **inefficient** and a **wasteful duplication of resources** for there to be **more than one firm operating in the market**.
  - E.g., Public utilities such as water / railways where multiple suppliers may build duplicated railroads in the same areas.
- Has **very high start-up costs** & experiences **economics of scale** over **most of their production**.
  - E.g., the marginal cost of an additional passenger is very low for the metro.
  - Hence, the **minimum efficient scale** is at an **extremely high level of output**.
    - It achieves **increasing returns to scale** at all almost levels of output.
    - The MES point is achieved beyond the AR curve.



- A natural monopoly is not **allocative efficient**.
  - If the firm charges a price at  $P = MC$  (where societal allocative efficiency occurs), it will inevitably make a loss because MC keeps under AC.

### Perfect Competition v.s. Monopoly

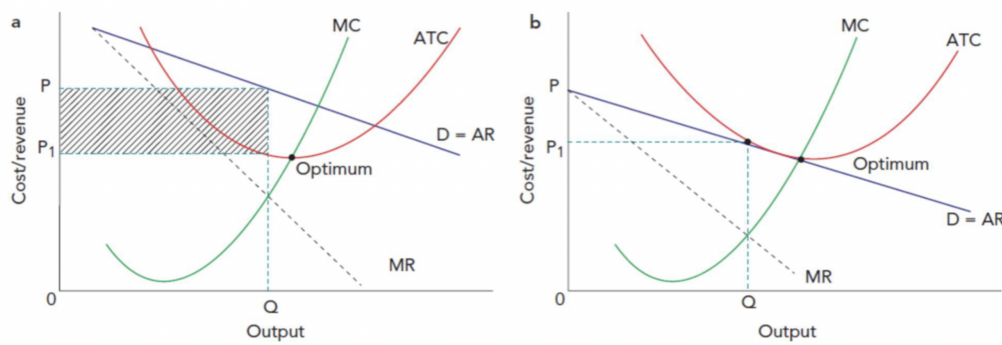


**Figure 7.38** Price and output under perfect competition and monopoly ▲

- In perfect competition, the firm will produce at QC with price PC, because it's where S meets D.
- When a monopoly occurs, a new MR occurs. The monopolist will equate MR with MC to give an output of QM with price PM.
  - This results in a reduction in output and an increase in price.
  - We can see a **deadweight loss** of  $\frac{1}{2} \times (QC - QM) \times (PM - PM_1)$ . This is because the unit welfare loss is AR - MC (the selling price - the allocatively efficient price).
- However, the monopoly may encounter economics of scale, pushing MC to MC1, which actually increases the output and lowers the price.
- **Comparison** with perfect competition:
  - Monopolies tend to **produce less output** and **charge a higher price** → imposing a deadweight loss on society.
  - Monopolies may be more **innovative**.
    - They have **supernormal profits**, and these profits are secured.
    - Incentive to cut production costs for profit maximization.
      - Remember, they are still dictated by the demand curve!
    - They are more **secure** → even if they fail, the market retains.
    - They may lose their technology monopoly if not innovate.
  - Monopolies will **corrupt their market power** → more **price discriminations**.

## Monopolistic Competition

- **Assumptions:**
  - **A large number** of small producers & consumers.
  - **No or low** barriers to entry.
  - **Product differentiation** (similar but differentiated products).
  - All firms aim to **maximize their profits**.
    - The demand curve is **relatively elastic**, yet downward sloping.
- **Short run:** Firms may make **supernormal profits** or **losses**, with **monopolistic firm market diagrams**.
- **Long run:** Firms tend to reach **normal profits** because of the low barrier to entry, shifting the demand curve for the firm to the left.
  - However, **non-price competitions** can help mitigate this process.



- **Efficiency:**

- **Productive efficiency:** Not productively efficient.

- There are less competitive pressure to minimize costs ( $\therefore$  differentiation).
    - Monopolistic markets still has market power, so they'll choose the profit-maximizing level of output.

- **Allocative efficiency:** Not allocatively efficient.

- Due to differentiation, they can earn more profits by setting price at average revenue instead of marginal costs.

- **Evaluation:**

Advantages	Disadvantages
Prices likely to be lower and output higher than <b>monopoly</b>	Price higher and output lower than in <b>perfect competition</b>
Wide variety of <b>differentiated</b> products	<b>Allocatively</b> inefficient
Competition encourages to keep costs down	<b>Productively</b> inefficient
Competition encourages high-quality products	<b>Non-price competition</b> may be wasteful in terms of resources (e.g., heavy advertising may only result in minimal differences)

### Price and non-price competitions

- Firms can slow the process of turning to normal profits through gaining more **market share** (so the demand curve won't shift).
- **Price competitions:** Firms compete by lowering prices.
  - **Advantage:** Beneficial for **consumers**  $\rightarrow$  increase in real income, decrease in inflation, progressive effect on distribution of income.
  - **Disadvantage:**
    - Harmful for **producers**  $\rightarrow$  decrease in profit margins.
    - Harmful for **consumers**  $\rightarrow$  when the smaller firms are drove out of the market, the large firms may bounce back their price higher to cover the cost of the price wall.
- **Non-price competitions:** Techniques to **differentiate** a firm's product, and to make the demand less price-inelastic (less perceived substitutes).
  - E.g., Advertising, Packaging (different quantities, sizes), Purchasing options, Loyalty schemes (loyalty card system), After-sales service.



- 就是一系列更吸引人的附加项目和选项。

## Oligopoly

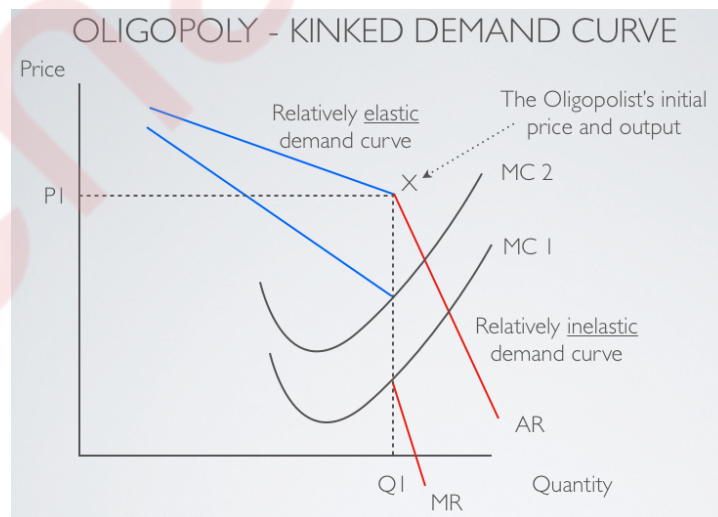
- **Assumptions:**
  - A few firms dominating the market.
  - The products may be homogeneous or differentiated.
  - There are high barriers to entry (depending on the industry).
  - Firms may or may not choose to maximize their profits.
  - Information is asymmetrical.
- **Fundamental characteristics:** There is strategic interdependence between firms.
  - They monitor each other's actions closely because any action by one firm will directly affect the others.
- **Evaluation:**
  - The pros and cons of an oligopoly depend on whether it colludes.
  - There may be some X-inefficiency present even if a competitive oligopoly is reached.
    - Because there are high barriers to entry, secured market share, and enough market power to set the price above the competitive level.

## Concentration Ratio

- Assess the degree of dominance of a few firms in a particular industry.
- An X-degree concentration ratio sums up the market share of the X largest firms in the industry.

## Kinked Demand Curve

- Prices tend to remain inflexible for a very long time, even if there's a change in costs.



- The demand curve above the prevailing price PI is elastic.
  - If a firm increases its price, the competitor firms will know that they would gain extra sales if they left their price at PI, so they will not follow the price rise.
- The demand curve below the prevailing price PI is inelastic.
  - If a firm decreases its price, the competitor firms know that most consumers will switch to the lower price, and hence will decrease their own price.



- There's a **price rigidity** between MC1 & MC2 → The profit-maximizing point  $MC = MR$  stays at PI.
- **Limitations:**
  - No explanation of how the **prevailing price** is derived.
  - Only deals with **price competition**, ignoring **non-price competition**.
  - Assumes oligopolies always operate in **predictable ways** over time.
    - A firm may decide on a price war when it can bear the cost while driving the rivals out.

## Prison Dilemma

- Why two **rational** people might **not cooperate**.
  - **Assumptions:** Both prisoners understand the nature of the game, have no loyalty to each other, and will have no opportunity for retribution or reward outside of the game.

Prisoner A \ Prisoner B	Prisoner B stays silent ( <i>cooperates</i> )	Prisoner B testifies ( <i>defects</i> )
	Prisoner A stays silent ( <i>cooperates</i> )	Prisoner A testifies ( <i>defects</i> )
Prisoner A stays silent ( <i>cooperates</i> )	Each serves 1 year	Prisoner A: 3 years Prisoner B: goes free
Prisoner A testifies ( <i>defects</i> )	Prisoner A: goes free Prisoner B: 3 years	Each serves 2 years

- Each player's **optimal response** is to defect:
  - If player B defects, he goes free if player A cooperates and serves 2 years if player A defects, which is the best strategy in both circumstances.
  - Parallel reasoning shows that player A shall defect as well.

## Collusions

- **Anti-competitive** actions by producers to **maximize** the **joint profit** of the group.
  - **Informal Collusion:** Firms implicitly cooperate to maximize their **joint profits**, **without any formal agreement**.
    - **Price leadership:** Firms automatically follow the lead of one of the groups, usually the most dominant firm.
  - **Formal Collusion (Cartel):** A **formal price or output agreement** between firms in an industry to restrict competition.
    - It is *illegal*.
- Their actions may include:
  - **Price agreement:** Set the price at a level above the **competitive market price** so that each firm, though with different cost structures, can earn a profit.
    - **Advantage:** Eliminate the possibility of a price war.
  - **Restriction of supply:** Decrease the supply to increase the price.
  - **Division of the market:** Dividing the markets based on certain characteristics, e.g., location, so that each firm can become a monopoly in the segmented market.

## Contestable Markets

- A market condition pushes **monopolistic** or **oligopolist** firms to act **competitively**.
  - They enable consumers to obtain economies of scale and reduce welfare losses.
- **Assumptions:**
  - For **new firms** entering the market:
    - **No barriers** to entry or exit.
    - No **limiting pricing**.
    - Have access to the **same technology** and **same regulation**.
    - Are able to **enter and exit rapidly** (hit-and-run).
  - Focuses on the **threat of potential competition**, not actual level of production.
- The incumbent firm(s) **cannot** set a price that is **higher than the average cost** because the supernormal profit will be competed by **hit-and-run entry** new firms.
  - **Limit pricing:** Setting a price below profit maximization to deter new entrants into the market.
- The growth of the internet increases the contestability of markets because information is more available, and barriers to entry are lower.

## 7.7 Growth and survival of firms

### Syllabus 7.7 >

- Reasons for difference sizes of firms.
- Internal growth of firms: organic growth and diversification.
- External growth of firms: integration (mergers and takeovers).
- Cartels: conditions and consequences.
- Principal-agent problems.

### Reasons for Firm Sizes

- At least 90% of businesses are small firms employing fewer than 10 people.

### Reasons for Smaller Firms

- The **market size** is too small.
- The firm may involve **specialist skills**, or will remain small to provide **personal attention** to each customer for which they will pay a higher price.
- There are **obstacles** in the firms' growth → e.g., lack of access to borrowed capital (no financial economies of scale).
- The firm may make a **loss** if it grows bigger.
- Small businesses may receive **financial help** from the government.
- The increases access to **technology through internet** makes the smaller firms more efficient, and thus doesn't need to grow bigger.
- It takes time for firms to grow from smaller firms to larger firms, and there's a high rate of failure in growth.

### Reasons for Larger Firms (for merger/acquisitions)

- To achieve **economies of scale**.
- To achieve **bigger market share** → monopolistic incentive.

- Bigger market share → more network effect & market power.
- To **diversify product range** → to spread business risks.
  - *Economies of scope*: The average total cost of production decreases as a result of **increasing the number of different goods produced**.
- To **capture the resources of another business**.

### Internal Growth of Firms

- A firm expands by increasing its own sales **using its own resources** (the firm grows **organically**).
- Through increasing productive capacity, advertisement, etc.
- Financed through **retained profits** or **borrowing from bank**.

### External Growth of Firms

- A firm expands by **joining with others** via **takeovers** or **mergers**.
- **Takeover**: Buy sufficient amount of shares to **have control** of the firm.
- **Merge**: Two firms form an **agreement**.
- Occurs when the **market is shrinking**.

### Integration

- Refers to the **way** in which two firms join together.
- **Horizontal integration**: Firms in the **same sector** of the **same industry**.
  - **Benefits**:
    - Economies of scale.
    - Increases market share & reduces competition.
  - **Drawbacks**:
    - Diseconomies of scale.
- **Vertical integration**: Firms in **different production stages** of the **same industry**.
  - **Forward**: A firm integrating with a **higher-sector** firm.
  - **Backward**: A firm integrating with a **lower-sector** firm.
  - **Benefits**:
    - Improves security and quality of supplies.
    - Reduces supply chain costs & increases selling profits.
    - Controlling retail = Controlling power to set prices.
  - **Drawbacks**:
    - Reduced flexibility → The firm could have chosen from a range of suppliers.
    - Complex management.
- **Conglomerate**: Firms in **different industries**.
  - **Benefits**: Spread risks from diversification.
  - **Drawbacks**: Difficult to manage (different industrial natures).

### Cartels

- A **formal agreement** between firms in an industry to **limit competition** & **maximize the join**

profit of all firms.

### Conditions of Cartels

- Limited number of firms.
- High concentration ratios.
- Control over sources of supply.
- Similar cost structures for all firms → so all companies will have the incentive to keep the price and output the same.
- High barriers to entry.
- There are measures to ensure compliance with the cartel's rules.

### Consequences of Cartels

- **Price agreements:** The cartel may set the market price at the point where,  $\text{Joint MC of cartel members} = \text{Market MR}$ .
- **Restriction of supply:** To manipulate the market power.
- **Division of market.**
- **Agreements on tendering:** To ensure a particular member of the cartel wins the contract by submitting intentionally uncompetitive bids, or not submitting bids at all.
  - Firms may agree on rotating on who's the successful bidder.
- **Reduced incentive to innovate.**
- **Monopsony power:** They may have the power to dictate prices over their suppliers.

### Principal-Agent Problems

- The situation where there are different objectives of owners (shareholders) and managers.
  - **Agent:** The managers who involve in day-to-day operations.
  - **Principal:** The owners of the company.
- **Asymmetric information** occurs in principal-agent problems.
  - The agent knows more about the company.
  - The principal doesn't know how the agent will act, yet the agent makes decision on behalf of the principal (**moral-hazard**).
- For example, while the managers want profit-maximization, agents may want to gain prestige through costly mergers that increases the size of the company.
  - The agents may also use the company's money for personal benefits, such as private jets :).

## 7.8 Different objectives and policies of firms

### Syllabus 7.8 >

- Traditional profit-maximizing objective of firms.
- An understanding of other objectives of firms (survival, profit satisficing, sales maximization, revenue maximization).
- Price discrimination - first, second and third degree.
  - Causes and consequences.
- Other pricing policies (limit pricing, predatory pricing, price leadership).

- Relationship between price elasticity of demand and a firm's revenue (normal demand curve and kinked demand curve).

## Profit-Maximizing Objective

- Firms producing at the output where  $MC = MR$ .
- Reasons for firms not operating at profit maximizing level of output:
  - Difficult to identify this output.
    - Firms may just work out the average total cost and add a profit margin on top of it.
  - **Short-term** profit maximization may not be in the **long-term** interest of the firm.
  - **Large supernormal profit** may attract new entrants.
  - High profits may damage the relationship between the firm and its stakeholders (e.g., its consumers).
  - **Principal-agent problem**: The management team may not want the high profit to attract takeovers of the firm, despite the willingness of shareholders to earn money.

## Other objectives

- Collectively known as *managerial* or *behavioral* objectives of firms.

## Survival

- Firms seek to not go out of business.
- Achieved through gaining market presence or minimizing losses.
  - *Gaining market presence*: through discounts, promotions, etc.
  - *Minimizing losses*: through reducing inventory, cut staff, etc.
- Applies to firms that are:
  - **Startups** and new ventures.
  - Firms in **financial stress**, **declining industries**, and **highly competitive markets**.
  - Firms during **economic crises**.
- Only exists for a short period of time.

## Profit Satisficing

- Firms seek to make a **reasonable** or **minimum** level of profit.
- Profit sufficient to satisfy the shareholders while satisfying the stakeholders.
  - E.g., managers want fringe benefits, workers want pay rises, etc.
- Applies to firms that are:
  - **Social enterprises**: Enough profit to fund operations is enough.
  - **Monopolistic competition**: Avoid setting profits that might provoke competitors or overstrain resources.

## Sales Maximization

- Firms seek to **maximize the ==volume of sales==**.
- Applies to firms that want:

1. **Social objectives:** Vaccine organizations seek to maximize the volume of vaccines because of the product's **external benefit**.
  2. **Growth maximization:** Firms that try to **achieve economies of scale** after the market share is increased.
  3. **Predatory pricing:** To earn enough market share that drives the rival firms out of business.
- **Cross-subsidization** can offset the losses from sales maximization.
    - Using the profit from one part of the firm to *offset* the loss of another.

## Revenue Maximization

- Firms seek to **maximize the revenue**.
  - They will produce where  $MC > MR$  provided that  $MR > 0$ .
- Applies to firms with **principal-agent problem**.
  - The managers may seek revenue maximization because their bonus is directly related to revenue than profits.

## Price Discrimination

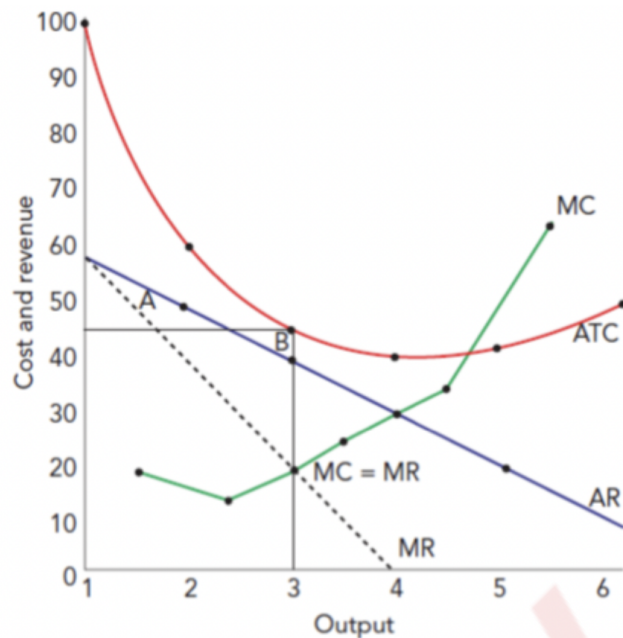
- Charging **different prices** for the same good or service to **different consumers**, not based on costs.
  - **Goal:** **Capture more consumer surplus** to increase revenue.

## Types of Price Discrimination

- **First-degree price discrimination** (*personalized pricing*).
  - Sellers charge **each individual consumer** the **maximum price** they are willing to pay, e.g., auction.
  - Mostly occurs in **service sectors**.
- **Second-degree price discrimination** (*product versioning*).
  - Sellers charge prices based on the **quantity consumed** or **product version** chosen, e.g., bulk discount or 第二个半价.
- **Third-degree price discrimination** (*group pricing*).
  - Sellers charge prices based on **different groups' characteristics**, e.g., plane tickets bought earlier are cheaper.

## Consequences of Price Discrimination

- Results in an **improvement in allocative efficiency**.
  - But is often achieved by **converting consumer surplus into profit**.
  - **Unfair** from an equity standpoint.
- Results in an **supernormal profit**.
  - At its profit maximizing output, the firm can earn  $45 \times 3 = \$135$ . However, if price discrimination is carried out, it can earn  $60 + 50 + 40 = \$150$ , with a **supernormal profit** of \$15.
  - If Area of triangle A > Area of triangle B, the firm will make a **supernormal profit** with price discrimination.



## Other Pricing Policies

### Limit Pricing

- Firms setting a **lower short-run price** to **deter new entry firms**.
  - Not necessarily **low till unprofitable**.
  - Achieved through **increasing output**.
- Applied in **monopolies** and **oligopolies**.

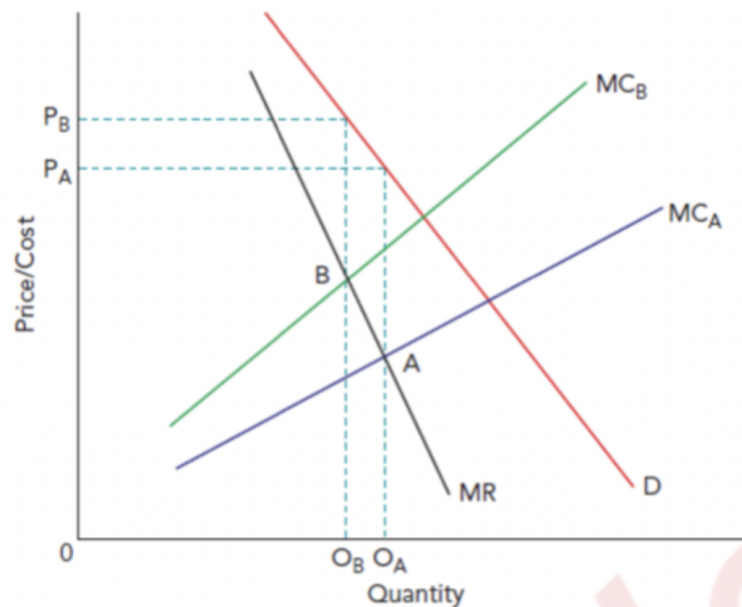
### Predatory Pricing

- Firms setting a **very low price** **that is below cost**.
  - Aim:** Driving the competitors out of market, or deterring entering firms.

### Price Leadership

- All firms in the market accept the price that is **set by the leading firm**.
  - Often the firm with the largest market share or is the brand leader.
- Smaller firms accept the price to **retain market share** → which may eventually lead to their market exit.
- Common in **oligopolies**.
  - Firm A sets its production at point A. Firm B has to follow to retain market share, and therefore has to produce at A, where its profit will be less due to its higher costs of production.

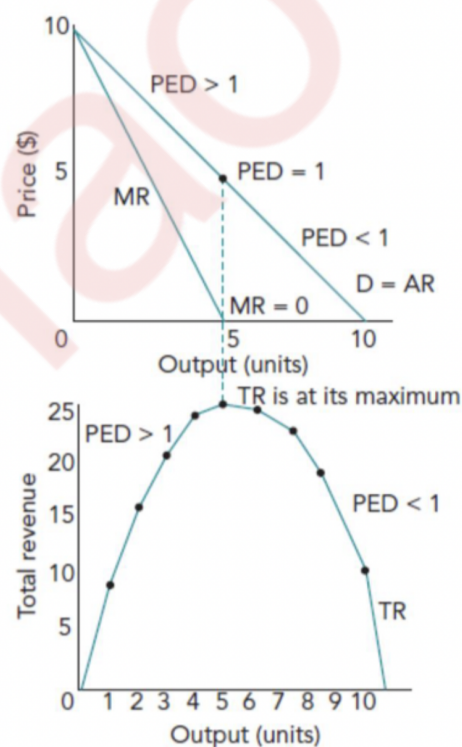




## PED and Revenue

### Downward Sloping Demand Curve

- For a straight-line demand curve, its PED decreases down the curve.
  - At elastic PED, **marginal revenue** is positive, and vice versa.
- There exists a point where  $PED = 1$ , and this is the **revenue maximizing point**.



### Kinked Demand Curve

- In a **kinked demand curve**, demand is elastic above the kink and inelastic below the kink.
  - Therefore, the best strategy is to stay at the kink.

# OLIGOPOLY - KINKED DEMAND CURVE

