



CAREER STUDY
The Learning App



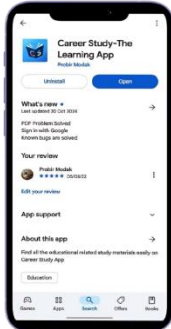
CAREER STUDY
The Learning App



CAREER STUDY
The Learning App

ABOUT CAREER STUDY:

Career Study is a forward-thinking educational platform designed to empower students across India, with a special focus on the Northeast region. Recognized as a **"Startup"** under the Assam Startup Policy 2016 by the Government of Assam and officially registered under the MSME, Government of India.



At Career Study, we believe in creating opportunities, fostering growth, and inspiring success—one student at a time.

ABOUT THE FOUNDER:

Probir Modak, the founder of Career Study, is an educator and entrepreneur from Silcoorie Camp and currently residing in Silchar, Kathal Road, Probir brings over 8 years of teaching experience and a deep passion for empowering students. His journey began at Assam University, Silchar.



Probir's achievements are deeply rooted in the unwavering support of his family, especially his mother (MAA), whose encouragement and guidance have been pivotal in his journey. Armed with a Master's degree in Economics from Assam University, Silchar.

SUPPORT US:

PLAY STORE – CAREER STUDY

YOUTUBE – CAREER STUDY

FACEBOOK – CAREER STUDY

WHATSAPP – CAREER STUDY



LEARN. GROW. SUCCEED.



CAREER STUDY
The Learning App



CAREER STUDY
The Learning App

Semester II
ECODSM- 151
Elementary Economics
Total Credits: 3

Unit 1: Introduction to Microeconomics

Meaning, nature, scope, importance, limitations of Micro Economics, Basic problems of economics, Problems of scarcity and choice, Choice and opportunity cost, production possibility frontier, economic systems, positive and normative economics.

Market Forces: Law of Demand, Law of Supply, determinants of demand/supply, Exceptions to law of demand, market demand and market supply, market equilibrium, elasticity of demand and supply, and their measurement

Unit 2: Theory of Consumer Behaviour:

Cardinal utility vs ordinal utility, cardinal utility and optimum choice, law of diminishing marginal utility, indifference curve, indifference map, budget constraint, consumer 's optimum choice, price consumption curve and income consumption curve, income and substitution effects (Hicks and Slutsky), Derivation of Demand Curves from ICs.

Unit 3: Production, Cost & Revenue

Production functions- short run and long run, law of variable proportions, Returns to scale, iso-quant and iso-cost lines, producers Equilibrium, Cost of production - types, short run cost curves, long run cost curves, Revenue-TR, AR & MR, revenue and elasticity of demand.

Unit 4: Introduction to Macroeconomics

Nature and scope of Macro Economics, importance and limitations of Macro Economics Macro variables, stock and flow concept, Macro statics, Macro dynamics, Concept of - two sector, three sector and four sector economy.

Unit 5: National income,

Concept of GNP, GDP, NNP, NDP, Private income Personal income, per capita income, real and nominal national income, Methods of measuring nation income, Difficulties of Estimating National Income, National income and economic welfare, circular flow of income in two sector, three sector and Four sector economy.



CAREER STUDY
The Learning App



CAREER STUDY
The Learning App

UNIT – 1

THEORY:

Meaning of Microeconomics

Microeconomics is a branch of economics that studies the behavior of individual economic agents, such as consumers, firms, and industries. It focuses on how these agents make decisions regarding the allocation of limited resources.

Nature of Microeconomics

1. **Individual Unit Analysis:** Studies individuals, firms, and industries rather than the economy as a whole.
2. **Price Theory:** Microeconomics primarily deals with the determination of prices in different markets.
3. **Resource Allocation:** Examines how resources are allocated among different uses to maximize efficiency.
4. **Partial Equilibrium Approach:** Focuses on equilibrium in a single market without considering the interrelation with other markets.
5. **Use of Marginal Analysis:** Decision-making is analyzed based on additional (marginal) benefits and costs.

Scope of Microeconomics

1. **Theory of Consumer Behavior:** Analyzes how consumers make decisions to allocate their limited income.
2. **Theory of Production and Costs:** Explains how firms decide on production levels and cost minimization.
3. **Market Structure and Pricing:** Examines different market types like perfect competition, monopoly, and oligopoly.
4. **Welfare Economics:** Deals with efficiency in resource allocation and distribution of income and wealth.

Importance of Microeconomics

1. **Understanding Consumer Behavior:** Helps analyze how consumers respond to price changes.
2. **Efficient Resource Allocation:** Guides firms in optimal production and pricing decisions.
3. **Policy Formulation:** Assists governments in designing economic policies like taxation and price control.
4. **Foundation of Economic Theories:** Forms the basis of macroeconomic analysis.
5. **Understanding Market Mechanisms:** Helps predict market trends and economic outcomes.

Limitations of Microeconomics

1. **Ignores Macro Factors:** Does not consider national income, inflation, or economic growth.
2. **Assumption of Perfect Competition:** Many models assume perfect competition, which is unrealistic.
3. **Static Nature:** Fails to analyze long-term changes in the economy.
4. **Limited Policy Application:** Cannot address large-scale economic problems like unemployment and inflation.

Basic Problems of Economics

Every economy faces fundamental economic problems due to scarcity of resources. These include:

1. **What to produce?** - Deciding which goods and services to produce based on demand and resource availability.
2. **How to produce?** - Choosing the production method: labor-intensive or capital-intensive.
3. **For whom to produce?** - Determining the distribution of goods among different sections of society.

Problems of Scarcity and Choice

- **Scarcity:** Resources are limited, while human wants are unlimited.
- **Choice:** Due to scarcity, individuals and societies must make choices regarding the use of resources.

Choice and Opportunity Cost

- **Choice:** Involves selecting one alternative over others due to limited resources.
- **Opportunity Cost:** The next best alternative foregone when making a decision.

Production Possibility Frontier (PPF)

- A curve showing the maximum possible output combinations of two goods that can be produced with available resources and technology.
- **Key Concepts:**
 - **Efficiency:** Any point on the PPF curve represents efficient use of resources.
 - **Unemployment/Inefficiency:** Any point inside the PPF indicates underutilization of resources.
 - **Economic Growth:** Outward shift of PPF due to improved technology or increased resources.

Economic Systems

1. **Capitalist Economy:** Private ownership, profit motive, and minimal government intervention.
2. **Socialist Economy:** Government ownership of resources, equal distribution, and central planning.

3. **Mixed Economy:** Features of both capitalism and socialism, with both private and public sector roles.

Positive and Normative Economics

- **Positive Economics:** Deals with objective analysis and facts (e.g., "An increase in demand raises prices").
- **Normative Economics:** Deals with value judgments and policy recommendations (e.g., "The government should reduce income inequality").

Market Forces

Law of Demand

- States that **other things being equal**, the quantity demanded of a good decreases as its price increases, and vice versa.
- **Demand Curve:** Downward sloping from left to right.
- **Reasons for Downward Slope:**
 1. **Substitution Effect:** When the price of a good rises, consumers switch to cheaper alternatives.
 2. **Income Effect:** A price increase reduces real income, leading to lower demand.
 3. **Diminishing Marginal Utility:** Additional units of a good provide less satisfaction, reducing willingness to pay.

Law of Supply

- States that **other things being equal**, the quantity supplied of a good increases as its price increases, and vice versa.
- **Supply Curve:** Upward sloping from left to right.

Determinants of Demand

1. **Price of the Good**
2. **Consumer Income**
3. **Prices of Related Goods (Substitutes and Complements)**
4. **Consumer Preferences**
5. **Expectations about Future Prices**
6. **Population and Market Size**

Determinants of Supply

1. **Price of the Good**
2. **Input Prices**
3. **Technology**

4. **Government Policies (Taxes, Subsidies, Regulations)**
5. **Future Price Expectations**
6. **Natural Factors (Weather, Disasters)**

Exceptions to the Law of Demand

1. **Giffen Goods:** Inferior goods where a price increase leads to higher demand (e.g., staple foods like rice).
2. **Veblen Goods:** Luxury goods where higher prices make them more desirable (e.g., branded items).
3. **Expectations of Future Price Rise:** Consumers may buy more even at higher prices.
4. **Necessities:** Demand for essential goods remains constant despite price changes.

Market Demand and Market Supply

- **Market Demand:** The total quantity demanded by all consumers at different price levels.
- **Market Supply:** The total quantity supplied by all producers at different price levels.

Market Equilibrium

- **Definition:** The price at which quantity demanded equals quantity supplied.
- **Surplus:** When supply exceeds demand, leading to price reduction.
- **Shortage:** When demand exceeds supply, leading to price increase.

Elasticity of Demand and Supply

Price Elasticity of Demand (PED)

- Measures how much quantity demanded changes with a price change.
- **Formula:** $PED = (\% \text{ change in quantity demanded}) / (\% \text{ change in price})$
- **Types:**
 1. **Elastic Demand ($PED > 1$):** Demand is sensitive to price changes.
 2. **Inelastic Demand ($PED < 1$):** Demand is not very responsive to price changes.
 3. **Unitary Elasticity ($PED = 1$):** Proportionate change in demand.

Price Elasticity of Supply (PES)

- Measures how much quantity supplied changes with a price change.
- **Formula:** $PES = (\% \text{ change in quantity supplied}) / (\% \text{ change in price})$
- **Types:**
 1. **Elastic Supply ($PES > 1$)**
 2. **Inelastic Supply ($PES < 1$)**
 3. **Unitary Elasticity ($PES = 1$)**

ONE MARK:

1. **What is Microeconomics?**
→ Microeconomics is the branch of economics that studies individual economic agents like consumers, firms, and industries.
2. **What does microeconomics primarily focus on?**
→ It focuses on price determination, resource allocation, and consumer behavior.
3. **Give one limitation of microeconomics.**
→ It ignores macroeconomic factors like inflation and national income.
4. **What are the three basic economic problems?**
→ What to produce, how to produce, and for whom to produce.
5. **What is scarcity?**
→ Scarcity means limited resources to satisfy unlimited human wants.
6. **Define opportunity cost.**
→ Opportunity cost is the next best alternative foregone when making a choice.
7. **What does the Production Possibility Frontier (PPF) show?**
→ It shows the maximum possible output combinations of two goods using available resources.
8. **What is a capitalist economy?**
→ An economy where resources are privately owned and operated for profit.
9. **Differentiate between positive and normative economics.**
→ Positive economics deals with facts, while normative economics deals with value judgments.
10. **State the Law of Demand.**
→ The quantity demanded of a good decreases as its price increases, ceteris paribus.
11. **Why is the demand curve downward sloping?**
→ Due to the income effect, substitution effect, and diminishing marginal utility.
12. **What are Giffen goods?**
→ Inferior goods for which demand increases as price increases.
13. **What is the Law of Supply?**
→ The quantity supplied of a good increases as its price increases, ceteris paribus.
14. **Give one determinant of demand.**
→ Price of the good.
15. **What is market equilibrium?**
→ It is the price at which quantity demanded equals quantity supplied.
16. **What happens when there is a surplus in the market?**
→ Prices tend to decrease.
17. **Define price elasticity of demand (PED).**
→ PED measures the responsiveness of quantity demanded to changes in price.

18. What is perfectly inelastic demand?

→ When demand does not change despite price changes ($PED = 0$).

19. What is the formula for price elasticity of supply (PES)?

→ $PES = (\% \text{ change in quantity supplied}) / (\% \text{ change in price})$.

20. What is a mixed economy?

→ An economy with features of both capitalism and socialism.

TWO MARK:

1. What is the nature of microeconomics?

Microeconomics is analytical and concerned with individual decision-making units such as consumers, firms, and industries. It studies price determination, resource allocation, and market structures.

2. Explain the scope of microeconomics.

Microeconomics covers topics like demand and supply analysis, consumer behavior, production and cost theories, market structures, and factor pricing. It helps understand how resources are allocated efficiently.

3. Why is microeconomics important?

Microeconomics helps in understanding market mechanisms, predicting consumer behavior, and making business decisions. It also assists governments in designing economic policies.

4. What are the limitations of microeconomics?

Microeconomics ignores macroeconomic factors like inflation and unemployment. It assumes perfect competition, which is rare in reality, and focuses only on individual units rather than the whole economy.

5. What are the basic problems of an economy?

Every economy faces three fundamental problems: (1) What to produce – deciding the goods and services to be produced, (2) How to produce – choosing the production technique, and (3) For whom to produce – determining the distribution among different sections of society.

6. Define scarcity and explain its significance.

Scarcity means limited availability of resources to satisfy unlimited human wants. It forces individuals and economies to make choices, leading to the study of economic decision-making.

7. What is the concept of opportunity cost?

Opportunity cost is the value of the next best alternative forgone when making a choice. For example, if a person spends money on a mobile phone instead of a laptop, the laptop is the opportunity cost.

8. Explain the production possibility frontier (PPF).

PPF is a curve that shows different combinations of two goods that an economy can produce with given resources. Points on the curve represent efficient use of resources, while points inside indicate inefficiency, and points outside are unattainable.

9. What are the main types of economic systems?

The three main economic systems are: (1) Capitalist economy – where private ownership and profit

motive dominate, (2) Socialist economy – where resources are controlled by the government, and (3) Mixed economy – which combines features of both capitalism and socialism.

10. Differentiate between positive and normative economics.

Positive economics deals with factual statements and describes economic phenomena without value judgments (e.g., "Inflation is rising"). Normative economics involves opinions and policy recommendations (e.g., "The government should reduce taxes").

11. State and explain the Law of Demand.

The Law of Demand states that when the price of a good rises, its quantity demanded decreases, and vice versa, assuming other factors remain constant. This inverse relationship is due to the income effect, substitution effect, and diminishing marginal utility.

12. What are the determinants of demand?

The key determinants of demand include the price of the good, income of consumers, tastes and preferences, prices of related goods (substitutes and complements), future expectations, and population size.

13. What are the exceptions to the Law of Demand?

Exceptions include Giffen goods (inferior goods where demand rises with price), Veblen goods (luxury goods demanded for prestige), and speculative goods (stocks, where higher prices attract more buyers).

14. What is the difference between individual demand and market demand?

Individual demand refers to the quantity of a good that a single consumer is willing to buy at different prices, whereas market demand is the total demand for a good by all consumers in the market at various prices.

15. State and explain the Law of Supply.

The Law of Supply states that as the price of a good increases, its quantity supplied also increases, assuming other factors remain constant. This direct relationship exists because higher prices provide an incentive for producers to produce more.

16. What are the determinants of supply?

The main factors influencing supply include the price of the good, production costs, technology, government policies (taxes and subsidies), number of sellers, and future price expectations.

17. What is market equilibrium?

Market equilibrium occurs when the quantity demanded equals the quantity supplied at a specific price level. At this point, there is no shortage or surplus, and the market operates efficiently.

18. What happens when there is excess demand or excess supply in a market?

Excess demand (shortage) occurs when quantity demanded exceeds quantity supplied, leading to a price increase. Excess supply (surplus) occurs when quantity supplied exceeds quantity demanded, causing a price decrease until equilibrium is restored.

19. Define price elasticity of demand (PED).

PED measures the responsiveness of quantity demanded to changes in price. It is calculated as % change in quantity demanded / % change in price. Higher elasticity means greater sensitivity to price changes.

20. What are the types of price elasticity of demand?

The five types of PED are: (1) Perfectly elastic demand ($PED = \infty$), (2) Highly elastic demand ($PED > 1$),

(3) Unitary elastic demand ($PED = 1$), (4) Inelastic demand ($PED < 1$), and (5) Perfectly inelastic demand ($PED = 0$).

21. What is cross elasticity of demand?

Cross elasticity of demand measures the responsiveness of demand for one good to changes in the price of another good. It is positive for substitute goods and negative for complementary goods.

22. What is income elasticity of demand?

Income elasticity of demand measures how the quantity demanded of a good changes with consumer income. It is positive for normal goods and negative for inferior goods.

23. Explain the concept of price elasticity of supply (PES).

PES measures the responsiveness of quantity supplied to changes in price. It is calculated as % change in quantity supplied / % change in price. A higher PES indicates greater responsiveness of supply.

24. What factors influence the elasticity of supply?

The main factors affecting PES include production time, availability of raw materials, storage capacity, and flexibility of production.

25. What is the importance of elasticity in economic decision-making?

Elasticity helps businesses set prices, governments determine tax policies, and policymakers evaluate the impact of economic changes on consumers and producers.

26. What is the difference between elastic and inelastic demand?

Elastic demand occurs when quantity demanded is highly responsive to price changes ($PED > 1$), whereas inelastic demand means quantity demanded changes very little with price changes ($PED < 1$).

27. What is unitary elastic demand?

Unitary elastic demand occurs when the percentage change in quantity demanded is equal to the percentage change in price ($PED = 1$), meaning total revenue remains constant.

28. What is perfectly inelastic supply?

Perfectly inelastic supply means the quantity supplied remains unchanged regardless of price changes ($PES = 0$). This is common for goods with fixed supply, such as rare artwork.

29. What is the relationship between total revenue and price elasticity of demand?

If demand is elastic ($PED > 1$), total revenue decreases with price increases. If demand is inelastic ($PED < 1$), total revenue increases with price increases.

30. What is a mixed economy and why is it preferred?

A mixed economy combines elements of both capitalism and socialism, allowing private ownership with government intervention. It balances economic efficiency with social welfare, making it a widely preferred system.

BOARD ANSWER:

1. Define Microeconomics. Discuss its meaning, nature, scope, importance, and limitations.

Meaning of Microeconomics:

Microeconomics is the branch of economics that studies individual economic units such as households, firms, and industries. It focuses on how these units make decisions regarding resource allocation, pricing, production, and consumption. The term “micro” is derived from the Greek word “mikros,” meaning small, indicating that it deals with small components of the economy rather than the economy as a whole.

Nature of Microeconomics:

1. **Individualistic Approach:** Microeconomics analyzes the behavior of individual consumers, firms, and markets rather than the economy as a whole.
2. **Price Theory:** It studies how prices of goods and services are determined in different market structures.
3. **Resource Allocation:** Microeconomics explains how scarce resources are allocated efficiently to maximize production and consumption.
4. **Partial Equilibrium Analysis:** It examines a single market or industry while assuming other factors remain constant (*ceteris paribus*).
5. **Based on Rationality:** It assumes that consumers and producers act rationally to maximize their utility and profit, respectively.

Scope of Microeconomics:

Microeconomics covers several important areas, including:

- **Demand and Supply Analysis:** It studies how the demand and supply of goods affect prices and market equilibrium.
- **Consumer Behavior:** It examines how consumers make choices to maximize their satisfaction under budget constraints.
- **Production and Cost Theory:** It analyzes how firms decide on the optimal production levels and costs associated with them.
- **Market Structures:** Microeconomics studies different types of markets, such as perfect competition, monopoly, monopolistic competition, and oligopoly.
- **Factor Pricing:** It examines how factors of production (land, labor, capital, and entrepreneurship) are rewarded in terms of rent, wages, interest, and profit.

Importance of Microeconomics:

- **Understanding Market Mechanism:** It explains how goods and services are allocated through market forces.
- **Business Decision Making:** Helps firms decide on pricing, production, and resource allocation.
- **Government Policies:** Assists governments in framing policies related to taxation, subsidies, and price control.
- **Economic Welfare:** Helps in achieving efficiency in production and distribution to improve economic welfare.

Limitations of Microeconomics:

- **Ignores Macroeconomic Factors:** It does not consider national issues like inflation, unemployment, and economic growth.
- **Assumption of Perfect Competition:** Many microeconomic theories assume perfect competition, which rarely exists in reality.
- **Static Analysis:** It does not consider dynamic changes in the economy over time.
- **Partial Analysis:** Focuses on individual markets while assuming other conditions remain unchanged.

2. Explain the Basic Economic Problems of Scarcity and Choice. Discuss the Concept of Opportunity Cost with an Example.

Basic Economic Problems:

Every economy, whether capitalist, socialist, or mixed, faces fundamental economic problems due to the scarcity of resources. The three main economic problems are:

1. What to Produce?

This problem deals with deciding which goods and services should be produced in what quantity. Since resources are limited, an economy must choose between essential goods (food, clothing, shelter) and luxury goods (cars, electronics).

2. How to Produce?

This problem concerns the method of production—whether to use labor-intensive techniques (more human labor, less machinery) or capital-intensive techniques (more machinery, less labor). The choice depends on resource availability and cost-effectiveness.

3. For Whom to Produce?

This question addresses how goods and services are distributed among different sections of society. Should resources be allocated based on income levels or government intervention?

Scarcity and Choice:

Scarcity means that resources are limited compared to unlimited human wants. Due to this limitation, individuals and societies must make choices about how to use resources efficiently. This leads to the concept of opportunity cost.

Opportunity Cost:

Opportunity cost is the value of the next best alternative foregone when making a choice. For example, if a farmer has limited land and can grow either wheat or rice, choosing to grow wheat means sacrificing the opportunity to produce rice. The lost production of rice is the opportunity cost of growing wheat.

3. What is the Production Possibility Frontier (PPF)? Explain its Features and Importance.

Definition of PPF:

The Production Possibility Frontier (PPF) is a curve that shows the maximum possible combinations of two goods that an economy can produce using its available resources and technology efficiently.

Features of PPF:

1. **Downward Sloping:** PPF slopes downward, indicating that producing more of one good requires sacrificing some of the other.
2. **Concave Shape:** The curve is concave to the origin due to the increasing opportunity cost, meaning more of one good must be given up to produce additional units of another.
3. **Efficient and Inefficient Points:** Points on the PPF represent efficient resource utilization, while points inside indicate underutilization. Points outside the curve are unattainable with current resources.
4. **Economic Growth and PPF Shift:** If an economy's resources increase or technology improves, the PPF shifts outward, indicating higher production capacity.

Importance of PPF:

- **Helps in Resource Allocation:** It helps in deciding how resources should be used for maximum output.
- **Demonstrates Opportunity Cost:** Shows the trade-off involved in choosing one good over another.
- **Indicates Economic Growth:** If an economy grows, the PPF shifts outward. If resources deplete, it shifts inward.

4. Explain the Law of Demand and the Factors Affecting Demand.

Law of Demand:

The Law of Demand states that, **ceteris paribus** (all other factors remaining constant), the quantity demanded of a good decreases when its price increases and vice versa. This inverse relationship between price and quantity demanded is due to:

- **Income Effect:** When the price of a good falls, consumers feel wealthier and buy more.
- **Substitution Effect:** When a good becomes cheaper, consumers substitute it for more expensive alternatives.
- **Diminishing Marginal Utility:** As consumers consume more of a good, the additional satisfaction from each unit decreases, reducing willingness to pay higher prices.

Factors Affecting Demand:

1. **Price of the Good:** An increase in price reduces demand, while a decrease increases demand.
2. **Consumer Income:** Higher income increases demand for normal goods and reduces demand for inferior goods.
3. **Tastes and Preferences:** Favorable changes increase demand, while unfavorable changes reduce it.

4. **Price of Related Goods:** Demand for a good increases when the price of its substitute rises and decreases when the price of its complement rises.
5. **Future Expectations:** If consumers expect prices to rise, they may buy more now, increasing current demand.
6. **Population and Market Size:** A larger population leads to higher demand.

5. What is Market Equilibrium? How is it Determined?

Definition of Market Equilibrium:

Market equilibrium is a situation where the quantity demanded equals the quantity supplied at a particular price. At this point, there is no tendency for price to change, and the market operates efficiently.

Determination of Equilibrium:

Market equilibrium is determined at the intersection of the demand and supply curves:

- **Excess Demand (Shortage):** If demand exceeds supply, prices rise, encouraging higher production and reducing demand until equilibrium is restored.
- **Excess Supply (Surplus):** If supply exceeds demand, prices fall, discouraging production and increasing demand until equilibrium is reached.

Importance of Market Equilibrium:

- **Ensures Efficient Resource Allocation:** Resources are allocated where they are most valued.
- **Stabilizes Prices:** Prevents unnecessary fluctuations in price levels.
- **Encourages Optimal Production:** Firms produce at a level where there is no wastage of resources.

6. Explain the Law of Supply and the Factors Affecting Supply.

Law of Supply:

The **Law of Supply** states that, **ceteris paribus** (all other factors remaining constant), the quantity supplied of a good increases when its price increases and decreases when its price decreases. This direct relationship between price and quantity supplied occurs because higher prices provide an incentive for producers to supply more in order to maximize profits.

Factors Affecting Supply:

1. **Price of the Good:** A higher price encourages producers to supply more, while a lower price discourages production.
2. **Cost of Production:** If the cost of raw materials, wages, or other inputs rises, supply decreases because production becomes more expensive.
3. **Technology:** Technological advancements improve efficiency, reducing costs and increasing supply.

4. **Government Policies:** Taxes reduce supply by increasing production costs, while subsidies increase supply by making production more profitable.
5. **Price of Related Goods:** If the price of a substitute good increases, producers may shift resources to produce that good instead.
6. **Future Expectations:** If producers expect future price increases, they may reduce current supply to sell later at higher prices.
7. **Number of Sellers:** More sellers in the market increase overall supply, while fewer sellers reduce it.

Exceptions to the Law of Supply:

- **Agricultural Goods:** Some agricultural products have a fixed supply due to natural limitations.
- **Perishable Goods:** Goods with short shelf life may not always follow the law of supply.
- **Art and Antiques:** Unique or rare items cannot have increased supply even at higher prices.

Importance of Law of Supply:

- Helps businesses understand how price changes impact supply decisions.
- Assists policymakers in designing tax and subsidy policies to regulate supply.
- Aids in predicting market behavior and equilibrium prices.

7. Explain the Concept of Elasticity of Demand and Its Measurement.

Meaning of Elasticity of Demand:

Elasticity of demand measures the responsiveness of quantity demanded to changes in price, income, or the price of related goods. It helps businesses and policymakers understand how consumers react to changes in economic variables.

Types of Elasticity of Demand:

1. **Price Elasticity of Demand (PED):** Measures how much the quantity demanded changes when the price of a good changes.

$$PED = \frac{\% \text{ change in quantity demanded}}{\% \text{ change in price}}$$

- **Elastic Demand (PED > 1):** Consumers are highly responsive to price changes (e.g., luxury goods).
- **Inelastic Demand (PED < 1):** Consumers are less responsive to price changes (e.g., essential goods).
- **Unitary Elastic Demand (PED = 1):** Percentage change in price leads to an equal percentage change in quantity demanded.
- **Perfectly Elastic Demand (PED = ∞):** Demand drops to zero with any price increase (e.g., perfectly competitive market).

- **Perfectly Inelastic Demand (PED = 0):** Demand remains unchanged despite price changes (e.g., life-saving drugs).
2. **Income Elasticity of Demand (YED):** Measures how demand changes with changes in consumer income.

$$YED = \frac{\% \text{ change in quantity demanded}}{\% \text{ change in income}}$$

- **Positive YED:** Normal goods (demand increases with income).
 - **Negative YED:** Inferior goods (demand decreases with income).
3. **Cross Elasticity of Demand (XED):** Measures how demand for one good changes when the price of another good changes.

$$XED = \frac{\% \text{ change in quantity demanded of Good A}}{\% \text{ change in price of Good B}}$$

- **Positive XED:** Substitute goods (e.g., tea and coffee).
- **Negative XED:** Complementary goods (e.g., cars and fuel).
- **Zero XED:** Unrelated goods (e.g., shoes and rice).

Importance of Elasticity of Demand:

- **Pricing Strategy:** Businesses use PED to decide on pricing policies.
- **Revenue Prediction:** Helps firms understand how price changes impact total revenue.
- **Government Policy:** Taxation policies consider demand elasticity to minimize economic burdens.
- **Substitute and Complement Analysis:** Helps businesses understand competition and product relationships.

UNIT – 2

THEORY:

Theory of Consumer Behaviour

Consumer behavior theory explains how individuals make choices regarding the consumption of goods and services to maximize their satisfaction or utility. This unit focuses on two major approaches: the **cardinal utility approach** and the **ordinal utility approach**.

1. Cardinal Utility vs. Ordinal Utility

Utility is the satisfaction a consumer derives from consuming goods and services. There are two major approaches to measuring utility:

A. Cardinal Utility Approach

- Assumes that utility is measurable in numerical terms (e.g., utils).
- Developed by **classical economists** such as Alfred Marshall.
- Consumers make rational choices to maximize total utility.
- The marginal utility of a good diminishes as consumption increases.

B. Ordinal Utility Approach

- Assumes that utility cannot be measured numerically but can be ranked or ordered.
 - Developed by **modern economists** such as J.R. Hicks and Vilfredo Pareto.
 - Uses **indifference curves** to represent consumer preferences.
 - Consumers choose the combination of goods that maximizes their satisfaction given their budget constraints.
-

2. Cardinal Utility and Optimum Choice

In the **cardinal utility approach**, consumers make decisions based on **marginal utility per rupee spent**. The condition for **optimum choice** is:

$$\frac{MU_X}{P_X} = \frac{MU_Y}{P_Y}$$

Where:

- **MU_X** and **MU_Y** are the marginal utilities of goods X and Y.
- **P_X** and **P_Y** are the prices of goods X and Y.

Consumers allocate their budget in such a way that the last rupee spent on each good gives them equal satisfaction, leading to **maximum total utility**.

3. Law of Diminishing Marginal Utility (DMU)

The **Law of Diminishing Marginal Utility** states that as a consumer consumes more units of a good, the additional satisfaction (marginal utility) derived from each successive unit decreases.

Assumptions of DMU:

1. Consumer's **taste and preferences** remain constant.
2. The **units of the commodity** consumed are identical.
3. The **consumer is rational** and aims to maximize utility.

Diagrammatic Representation:

- The **marginal utility curve** slopes **downward** from left to right, showing that each additional unit provides less satisfaction.

Importance of DMU:

- Explains why demand curves slope downward.
- Justifies the need for **diversified consumption**.
- Forms the basis of **consumer equilibrium** in the cardinal utility approach.

4. Indifference Curve Analysis

The **ordinal utility approach** uses **indifference curves (ICs)** to analyze consumer preferences.

A. Indifference Curve (IC)

- A curve that shows different combinations of two goods that provide the consumer **equal satisfaction**.
- The consumer is **indifferent** between these combinations.

Properties of Indifference Curves:

1. **Negatively Sloped:** More of one good can only be consumed by giving up some of the other.
2. **Convex to the Origin:** Due to the law of **diminishing marginal rate of substitution (MRS)**.
3. **Higher ICs Represent Higher Utility:** More consumption increases satisfaction.
4. **ICs Do Not Intersect:** Each IC represents a unique level of utility.

B. Indifference Map

- A set of indifference curves showing different levels of consumer satisfaction.
- Higher curves represent **greater satisfaction**.

C. Budget Constraint

- The consumer's income limits the combinations of goods they can buy.

- The **budget line equation** is:

$$P_X Q_X + P_Y Q_Y = M$$

Where:

- P_X, P_Y = Prices of goods X and Y
- Q_X, Q_Y = Quantities of goods X and Y
- M = Consumer's income

5. Consumer's Optimum Choice

The consumer reaches **optimum equilibrium** where the **budget line** is **tangent** to the **highest possible indifference curve**.

Condition for Optimum Choice:

$$\frac{MU_X}{MU_Y} = \frac{P_X}{P_Y}$$

At this point, the consumer is maximizing satisfaction by balancing the marginal rate of substitution with the price ratio.



The Learning App

6. Price Consumption Curve (PCC) & Income Consumption Curve (ICC)

A. Price Consumption Curve (PCC)

- Shows how the **consumer's optimum choice changes** when the price of a good changes while income remains constant.
- Derived from **different tangency points** between ICs and budget lines as price changes.
- Used to derive the **demand curve**.

B. Income Consumption Curve (ICC)

- Shows how the **consumer's optimum choice changes** when **income changes**, keeping prices constant.
- Helps distinguish between **normal goods** (ICC slopes upward) and **inferior goods** (ICC slopes downward).

7. Income and Substitution Effects (Hicks & Slutsky)

When the price of a good changes, two effects come into play:

1. **Income Effect:** A fall in price increases real income, allowing the consumer to buy more.

2. **Substitution Effect:** A lower price makes the good relatively cheaper, encouraging the consumer to substitute it for other goods.

Hicksian Approach: Separates income and substitution effects while keeping total utility constant.

Slutsky Approach: Separates effects while keeping purchasing power constant.

8. Derivation of Demand Curve from Indifference Curves

The demand curve can be derived using **indifference curves and budget lines**.

1. As the **price of a good falls**, the budget line pivots outward.
2. The **consumer moves to a higher indifference curve**, increasing consumption of the cheaper good.
3. Plotting these price-quantity combinations results in the **downward-sloping demand curve**.

ONE MARK:

1. **What is utility?**
 - Utility is the satisfaction or pleasure derived from consuming a good or service.
2. **What are the two types of utility approaches?**
 - Cardinal utility approach and ordinal utility approach.
3. **Who developed the cardinal utility approach?**
 - Alfred Marshall.
4. **Who introduced the ordinal utility approach?**
 - J.R. Hicks and Vilfredo Pareto.
5. **What is the law of diminishing marginal utility?**
 - It states that as a person consumes more units of a good, the additional satisfaction from each extra unit decreases.
6. **What is an indifference curve?**
 - It is a curve that shows different combinations of two goods providing the same level of satisfaction to the consumer.
7. **What is an indifference map?**
 - A set of indifference curves representing different levels of satisfaction.
8. **What is the slope of an indifference curve called?**
 - The marginal rate of substitution (MRS).
9. **What is the budget line?**

- It represents all possible combinations of two goods that a consumer can buy with their given income.

10. What is the equation of the budget line?

- $P_X Q_X + P_Y Q_Y = M$ (where P = price, Q = quantity, M = income).

11. What is consumer equilibrium?

- It is the point where the budget line is tangent to the highest possible indifference curve.

12. What is the price consumption curve (PCC)?

- It shows how the consumer's equilibrium changes when the price of one good changes.

13. What is the income consumption curve (ICC)?

- It shows how the consumer's equilibrium changes when income changes.

14. What is the substitution effect?

- The effect of a price change that makes a good relatively cheaper, encouraging consumers to buy more of it.

15. What is the income effect?

- The effect of a price change that increases or decreases a consumer's real income, affecting consumption.

16. What does the Slutsky equation explain?

- It separates the total price effect into the substitution effect and the income effect.

17. What happens to the demand for an inferior good when income increases?

- The demand decreases.

18. Why do indifference curves never intersect?

- Because each curve represents a different level of satisfaction, and a single bundle cannot provide two different satisfaction levels.

19. What is the shape of an indifference curve?

- Convex to the origin due to the diminishing marginal rate of substitution.

20. What does the demand curve represent?

- The relationship between the price of a good and the quantity demanded.

TWO MARK:

1. What is the difference between cardinal utility and ordinal utility?

- Cardinal utility assumes that utility can be measured in absolute numbers (e.g., utils), whereas ordinal utility only ranks preferences without assigning numerical values. The cardinal approach is based on measurable satisfaction, while the ordinal approach relies on consumer rankings of preferences.

2. What is the law of diminishing marginal utility?

- The law states that as a consumer consumes more units of a good, the additional satisfaction (marginal utility) from each successive unit decreases. For example, eating the first slice of pizza gives high satisfaction, but each additional slice gives less satisfaction than the previous one.

3. What is an indifference curve?

- An indifference curve represents all combinations of two goods that provide the same level of satisfaction to a consumer. It slopes downward and is convex to the origin due to the diminishing marginal rate of substitution.

4. What is the marginal rate of substitution (MRS)?

- MRS is the rate at which a consumer is willing to substitute one good for another while maintaining the same level of satisfaction. It is calculated as the absolute slope of the indifference curve. MRS diminishes as more of one good is consumed.

5. Why does an indifference curve slope downward?

- It slopes downward because if a consumer gives up some amount of one good, they must gain some amount of the other good to maintain the same level of satisfaction. This reflects the trade-off in consumption.

6. Why is an indifference curve convex to the origin?

- The curve is convex due to the diminishing marginal rate of substitution. As a consumer moves along the curve, they are willing to give up fewer units of one good to get additional units of the other.

7. What is a budget line?

- A budget line represents all possible combinations of two goods that a consumer can buy given their income and the prices of the goods. The equation is $P_X Q_X + P_Y Q_Y = M$, where P_X is price, Q_X is quantity, and M is income.

8. What happens when the budget line shifts?

- If the budget line shifts outward, it means the consumer's income has increased, allowing them to buy more goods. If it shifts inward, it means income has decreased, reducing the purchasing power.

9. What is consumer equilibrium in the indifference curve approach?

- Consumer equilibrium is reached when the budget line is tangent to the highest possible indifference curve. This point represents the best combination of goods the consumer can afford while maximizing satisfaction.

10. What is the price consumption curve (PCC)?

- The PCC traces the changes in consumer equilibrium as the price of one good changes while income and the price of the other good remain constant. It helps in deriving the demand curve for a good.

11. What is the income consumption curve (ICC)?

- The ICC shows how a consumer's demand for goods changes with variations in income, keeping prices constant. If both goods are normal, the ICC slopes upwards, indicating an increase in consumption.

12. What is the difference between normal goods and inferior goods?

- A normal good is one for which demand increases as income rises, while an inferior good is one for which demand decreases when income rises, as consumers shift to better-quality substitutes.

13. What is the substitution effect?

- The substitution effect occurs when a price change makes a good relatively cheaper or costlier compared to other goods, leading consumers to substitute the cheaper good for the expensive one while keeping satisfaction constant.

14. What is the income effect?

- The income effect occurs when a price change affects the consumer's real income. If the price of a good falls, the consumer's purchasing power increases, leading them to buy more of that good.

15. What is the difference between the substitution effect and the income effect?

- The substitution effect changes consumption due to relative price changes, while the income effect changes consumption due to changes in real income. For normal goods, both effects work in the same direction, increasing demand when price falls.

16. What is the Hicksian approach to income and substitution effects?

- Hicks decomposed the price effect into the substitution effect (adjusting for changes in relative prices) and the income effect (adjusting for changes in real income). This method helps understand consumer behavior in response to price changes.

17. What is the Slutsky equation?

- The Slutsky equation breaks the total effect of a price change into substitution and income effects. It states that the total price effect equals the substitution effect plus the income effect.

18. How is a demand curve derived from an indifference curve?

- The demand curve is derived by tracing how a consumer's equilibrium quantity demanded changes as the price of a good changes, keeping income and other factors constant. The price consumption curve (PCC) helps in this derivation.

19. Why do indifference curves never intersect?

- If two indifference curves intersect, it would imply that the same combination of goods provides different levels of satisfaction, which is logically impossible. Each curve represents a unique level of utility.

20. What is the difference between a budget constraint and a budget set?

- A budget constraint is the equation representing the maximum combinations of goods a consumer can buy, whereas a budget set includes all the affordable combinations within the given budget.

21. What is the effect of an increase in consumer income on the budget line?

- An increase in consumer income shifts the budget line outward, allowing the consumer to buy more goods, while a decrease in income shifts it inward.

22. What is the Engel Curve?

- The Engel Curve shows the relationship between a consumer's income and the quantity demanded of a good. It slopes upward for normal goods and downward for inferior goods.

23. What is a Giffen good?

- A Giffen good is an inferior good for which the income effect outweighs the substitution effect, leading to an increase in demand when its price rises (e.g., staple foods like rice or bread in poor communities).

24. What is the concept of diminishing marginal rate of substitution?

- It states that as a consumer consumes more of one good, they are willing to give up fewer units of the other good to maintain the same level of satisfaction. This leads to the convex shape of indifference curves.

25. What is a perfect substitute in the indifference curve approach?

- A perfect substitute is a good that can replace another completely, leading to a straight-line indifference curve (e.g., different brands of bottled water).

26. What is a perfect complement in the indifference curve approach?

- A perfect complement is a good that is always consumed with another good in a fixed ratio (e.g., left and right shoes). The indifference curve is L-shaped.

27. What is the concept of corner solutions in consumer behavior?

- A corner solution occurs when a consumer spends all their income on only one good instead of a combination, leading to an equilibrium at the edge of the budget constraint.

28. Why is the demand curve downward-sloping?

- The demand curve slopes downward due to the law of diminishing marginal utility, the income effect, and the substitution effect. As the price decreases, consumers buy more.

29. What is the relationship between total utility and marginal utility?

- Total utility increases as more units of a good are consumed, but the rate of increase slows down due to diminishing marginal utility. When marginal utility becomes zero, total utility reaches its maximum.

30. What is consumer rationality in economics?

- Consumer rationality means that individuals make decisions to maximize their satisfaction given their budget constraints. Rational consumers allocate resources efficiently to get the highest possible utility.

BOARD ANSWER:

Top Six Differences between Cardinal and Ordinal Utility:

Cardinal Utility	Ordinal Utility
Definition	
It explains that the satisfaction level after consuming any goods or services can be scaled in terms of countable numbers.	It explains that the satisfaction level after consuming any goods or services cannot be scaled in numbers. However, these things can be arranged in the order of preference.
Example	
Pizza gives Sam 60 utils of satisfaction, whereas burger gives him only 40 utils.	Sam gets more satisfaction from a pizza as compared to that of a burger.
Measurement	
Utility is measured based on utils.	Utility is ranked based on satisfaction.
Realistic	
It is less practical.	It is more practical and sensible.
Used By	
This theory was applied by Prof. Marshall	This theory was applied by Prof. J R Hicks

Consumer's Behaviour: Cardinal Utility Analysis (Explained With Diagram):

Cardinal utility analysis is the oldest theory of demand which provides an explanation of consumer's demand for a product and derives the law of demand which establishes an inverse relationship between price and quantity demanded of a product.

Introduction:

The price of a product depends upon the demand for and the supply of it. In this part of the book we are concerned with the theory of consumer's behaviour, which explains his demand for a good and the factors determining it. Individual's demand for a product depends upon price of the product, income of the individual, the prices of related goods.

ADVERTISEMENTS:

It can be put in the following functional form:

$$D_x = f(P_x, I, P_y, P_z, T \text{ etc.})$$

where D_x stands for the demand of good X, P_x for price of good X, I for individual's income, P_y P_z for the prices of related goods and T for tastes and preferences of the individual. But among these determinants of demand, economists single out price of the good in question as the most important factor governing the demand for it. Indeed, the function of a theory of consumer's behaviour is to establish a relationship between quantity demanded of a good and its own price and to provide an explanation for it.

Recently, cardinal utility approach to the theory of demand has been subjected to severe criticisms and as a result some alternative theories, namely, Indifference Curve Analysis, Samuelson's Revealed Preference Theory, and Hicks' Logical Weak Ordering Theory have been propounded.

Assumptions of Cardinal Utility Analysis:

Cardinal utility analysis of demand is based upon certain important assumptions. Before explaining how cardinal utility analysis explains consumer's equilibrium in regard to the demand for a good, it is essential to describe the basic assumptions on which the whole utility analysis rests. As we shall see later, cardinal utility analysis has been criticised because of its unrealistic assumptions.

The basic assumptions or premises of cardinal utility analysis are as follows:

The Cardinal Measurability of Utility:

The exponents of cardinal utility analysis regard utility to be a cardinal concept. In other words, they hold that utility is a measurable and quantifiable entity. According to them, a person can express utility or satisfaction he derives from the goods in the quantitative cardinal terms. Thus, a person can say that he derives utility equal to 10 units from the consumption of a unit of good A, and 20 units from the consumption of a unit of good B.

Moreover, the cardinal measurement of utility implies that a person can compare utilities derived from goods in respect of size, that is, how much one level of utility is greater than another. A person can say that the utility he gets from the consumption of one unit of good B is double the utility he obtains from the consumption of one unit of good A.

According to Marshall, marginal utility is actually measurable in terms of money. Money represents the general purchasing power and it can therefore be regarded as a command over alternative utility-

yielding goods. Marshall argues that the amount of money which a person is prepared to pay for a unit of a good rather than go without it is a measure of the utility he derives from that good.

Thus, according to him, money is the measuring rod of utility. Some economists belonging to the cardinalist school measure utility in imaginary units called “utils”. They assume that a consumer is capable of saying that one apple provides him utility equal to 4 utils. Further, on this ground, he can say that he gets twice as much utility from an apple as compared to an orange.

The Hypothesis of Independent Utilities:

The second important tenet of the cardinal utility analysis is the hypothesis of independent utilities. On this hypothesis, the utility which a consumer derives from a good is the function of the quantity of that good and of that good only. In other words, the utility which a consumer obtains from a good does not depend upon the quantity consumed of other goods; it depends upon the quantity purchased of that good alone.

On this assumption, then the total utility which a person gets from the whole collection of goods purchased by him is simply the total sum of the separate utilities of the goods. Thus, the cardinalist school regards utility as ‘additive’, that is, separate utilities of different goods can be added to obtain the total sum of the utilities of all goods purchased.

Constancy of the Marginal Utility of Money:

Another important assumption of the cardinal utility analysis is the constancy of the marginal utility of money. Thus, while the cardinal utility analysis assumes that marginal utilities of commodities diminish as more of them are purchased or consumed, but the marginal utility of money remains constant throughout when the individual is spending money on a good and due to which the amount of money with him varies. Daniel Bernoulli first of all introduced this assumption but later Marshall adopted this in his famous book “Principles of Economics”.

As stated above, Marshall measured marginal utilities in terms of money. But measurement of marginal utility of goods in terms of money is only possible if the marginal utility of money itself remains constant. It should be noted that the assumption of constant marginal utility of money is very crucial to the Marshallian analysis, because otherwise Marshall could not measure the marginal utilities of goods in terms of money. If money which is the unit of measurement itself varies as one is measuring with it, it cannot then yield correct measurement of the marginal utility of goods.

When price of a good falls and as a result the real income of the consumer rises, marginal utility of money to him will fall but Marshall ignored this and assumed that marginal utility of money did not change as a result of the change in price. Likewise, when price of a good rises the real income of the consumer will fall and his marginal utility of money will rise. But Marshall ignored this and assumed that marginal utility of money remains the same. Marshall defended this assumption on the ground that “his (the individual consumer’s) expenditure on any one thing is only a small part of his whole expenditure.”

Introspective Method:

Another important assumption of the cardinal utility analysis is the use of introspective method in judging the behaviour of marginal utility. “Introspection is the ability of the observer to reconstruct events which go on in the mind of another person with the help of self-observation. This form of comprehension may be just guesswork or intuition or the result of long lasting experience.”

Thus, the economists construct with the help of their own experience the trend of feeling which goes on in other men's mind. From his own response to certain forces and by experience and observation one gains understanding of the way other people's minds would work in similar situations. To sum up, in introspective method we attribute to another person what we know of our own mind. That is, by looking into ourselves we see inside the heads of other individuals.

So, the law of diminishing marginal utility is based upon introspection. We know from our own mind that as we have more of a thing, the less utility we derive from an additional unit of it. We conclude from it that other individuals' mind will work in a similar fashion, that is, marginal utility to them of a good will diminish as they have more units of it.

With the above basic premises, the founders of cardinal utility analysis have developed two laws which occupy an important place in economic theory and have several applications and uses.

These two laws are:

- (1) Law of Diminishing Marginal Utility and
- (2) Law of Equi-Marginal Utility.

It is with the help of these two laws about consumer's behaviour that the exponents of cardinal utility analysis have derived the law of demand. We explain below these two laws in detail and how law of demand is derived from them.

Law of Diminishing Marginal Utility:

An important tenet of cardinal utility analysis relates to the behaviour of marginal utility. This familiar behaviour of marginal utility has been stated in the Law of Diminishing Marginal Utility according to which marginal utility of a good diminishes as an individual consumes more units of a good. In other words, as a consumer takes more units of a good, the extra utility or satisfaction that he derives from an extra unit of the good goes on falling.

It should be carefully noted that it is the marginal utility and not the total utility that declines with the increase in the consumption of a good. The law of diminishing marginal utility means that the total utility increases at a decreasing rate.

Marshall who has been a famous exponent of the cardinal utility analysis has stated the law of diminishing marginal utility as follows:

"The additional benefit which a person derives from a given increase of his stock of a thing diminishes with every increase in the stock that he already has."

This law is based upon two important facts. First, while the total wants of a man are virtually unlimited, each single want is satiable. Therefore, as an individual consumes more and more units of a good, intensity of his want for the good goes on falling and a point is reached where the individual no longer wants any more units of the good. That is, when saturation point is reached, marginal utility of a good becomes zero. Zero marginal utility of a good implies that the individual has all that he wants of the good in question.

The second fact on which the law of diminishing marginal utility is based is that the different goods are not perfect substitutes for each other in the satisfaction of various wants. When an individual consumes more and more units of a good, the intensity of his particular want for the good diminishes but if the units of that good could be devoted to the satisfaction of other wants and

yielded as much satisfaction as they did initially in the satisfaction of the first want, marginal utility of the good would not have diminished.

It is obvious from above that the law of diminishing marginal utility describes a familiar and fundamental tendency of human nature. This law has been arrived at by introspection and by observing how consumers behave.

Illustration of the Law of Diminishing Marginal Utility:

Consider Table 7.1 where we have presented the total and marginal utilities derived by a person from cups of tea consumed per day. When one cup of tea is taken per day the total utility derived by the person is 12 utils. And because this is the first cup its marginal utility is also 12 utils with the consumption of 2nd cup per day, the total utility rises to 22 utils but marginal utility falls to 10. It will be seen from the table that as the consumption of tea increases to six cups per day, marginal utility from the additional cup goes on diminishing (i.e. the total utility goes on increasing at a diminishing rate).

However, when the cups of tea consumed per day increases to seven, then instead of giving positive marginal utility, the seventh cup gives negative marginal utility equal to – 2 utils. This is because too many cups of tea consumed per day (say more than six for a particular individual) may cause acidity and gas trouble. Thus, the extra cups of tea beyond six to the individual in question gives him disutility rather than positive satisfaction.

Table 7.1. Diminishing Marginal Utility

<i>Cups of tea consumed per day (Q)</i>	<i>Total Utility (utils) TU</i>	<i>Marginals Utility (utils) $\frac{\Delta TU}{\Delta Q}$</i>
1	12	12
2	22	10
3	30	8
4	36	6
5	40	4
6	41	1
7	39	-2
8	34	-5

Figure 7.1 illustrates the total utility and the marginal utility curves. The total utility curve drawn in Figure 7.1 is based upon three assumptions. First, as the quantity consumed per period by a consumer increases his total utility increases but at a decreasing rate. This implies that as the consumption per period of a commodity by the consumer increases, marginal utility diminishes as shown in the lower panel of Figure 7.1.

Secondly, as will be observed from the figure when the rate of consumption of a commodity per period increases to Q_4 , the total utility of the consumer reaches its maximum level.

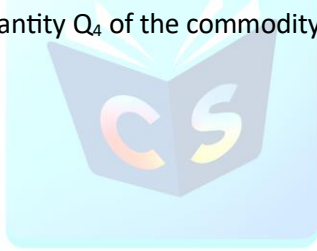
Therefore, the quantity Q_4 of the commodity is called satiation quantity or satiety point. Thirdly, the increase in the quantity consumed of the good per period by the consumer beyond the satiation point has an adverse effect on his total utility that is, his total utility declines if more than Q_4 quantity of the good is consumed.

This means beyond Q_4 marginal utility of the commodity for the consumer becomes negative and will be seen from the lower panel of Figure 7.1 beyond the satiation point Q_4 marginal utility curve MU goes below the X-axis indicating it becomes negative beyond quantity Q_4 per period of the commodity consumed.

It is important to understand how we have drawn the marginal utility curve. As stated above marginal utility is the increase in total utility of the consumer caused by the consumption of an additional unit of the commodity per period. We can directly find out the marginal utility of the successive units of the commodity consumed by measuring the additional utility which a consumer obtains from successive units of the commodity and plotting them against their respective quantities.

However, in terms of calculus, marginal utility of a commodity X is the slope of the total utility function $U = f(Q_x)$. Thus, we can derive the marginal utility curve by measuring the slope at various points of the total utility curve TU in the upper panel of Figure 7.1 by drawing tangents at them. For instance, at the quantity Q_1 marginal utility (i.e. $dU/dQ = MU_1$) is found out by drawing tangent at point A and measuring its slope which is then plotted against quantity in the lower panel of Figure 7.1. In the lower panel we measure marginal utility of the commodity on the Y-axis. Likewise, at quantity Q_2 marginal utility of the commodity has been obtained by measuring slope of the total utility curve TU at point B and plotting it in the lower panel against the quantity Q_2 .

It will be seen from the figure that at Q_4 of the commodity consumed, the total utility reaches at the maximum level T. Therefore, at quantity Q_4 the slope of the total utility curve is zero at this point. Beyond the quantity Q_4 the total utility declines and marginal utility becomes negative. Thus, quantity Q_4 of the commodity represents the satiation quantity.



CAREER STUDY
The Learning App

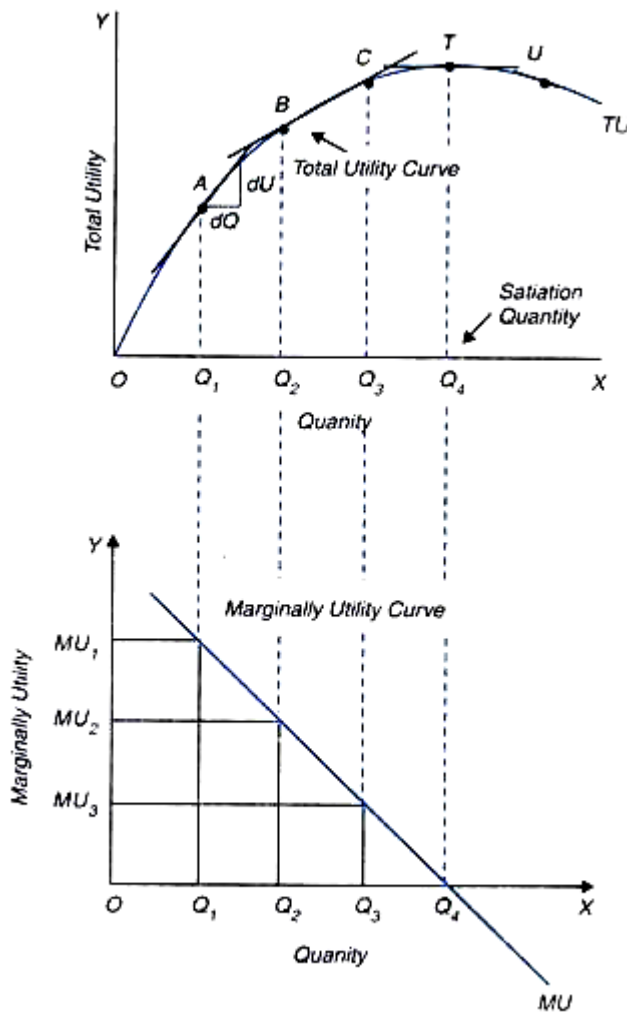


Fig. 7.1. . Total Utility and Marginal Utility

Another important relationship between total utility and marginal utility is worth noting. At any quantity of a commodity consumed the total utility is the sum of the marginal utilities. For example, if marginal utility of the first, second, and third units of the commodity consumed are 15, 12, and 8 units, the total utility obtained from these three units of consumption of the commodity must equals 35 units ($15 + 12 + 8 = 35$).

Similarly, in terms of graphs of total utility and marginal utility depicted in Figure 7.1 the total utility of the quantity Q_4 of the commodity consumed is the sum of the marginal utilities of the units of commodity up to point Q_4 . That is, the entire area under the marginal utility curve MU in lower panel up to the point Q_4 is the sum of marginal utilities which must be equal to the total utility Q_4T in the upper panel.

Marginal Utility and Consumer's Tastes and Preferences:

The utility people derive from consuming a particular commodity depends on their tastes and preferences. Some consumers like oranges, others prefer apples and still others prefer bananas for consumption. Therefore, the utility which different individuals get from these various fruits depends on their tastes and preferences.

An individual would have different marginal utility curves for different commodities depending on his tastes and preferences. Thus, utility which people derive from various goods reflect their tastes and preferences for them. However, it is worth noting that we cannot compare utility across consumers. Each consumer has a unique subjective utility scale. In the context of cardinal utility analysis, a change in consumer's tastes and preferences means a shift in his one or more marginal utility curves.

However, it may be noted that a consumer's tastes and preferences do not frequently change, as these are determined by his habits. Of course, tastes and preferences can change occasionally. Therefore, in economic theory we generally assume that tastes or preferences are given and relatively stable.

Significance of Diminishing Marginal Utility:

The significance of the diminishing marginal utility of a good for the theory of demand is that it helps us to show that the quantity demanded of a good increase as its price falls and vice versa. Thus, it is because of the diminishing marginal utility that the demand curve slopes downward. If properly understood the law of diminishing marginal utility applies to all objects of desire including money.

But it is worth mentioning that marginal utility of money is generally never zero or negative. Money represents purchasing power over all other goods, that is, a man can satisfy all his material wants if he possesses enough money. Since man's total wants are practically unlimited, therefore, the marginal utility of money to him never falls to zero.

The marginal utility analysis has a good number of uses and applications in both economic theory and policy. The concept of marginal utility is of crucial significance in explaining determination of the prices of commodities. The discovery of the concept of marginal utility has helped us to explain the paradox of value which troubled Adam Smith in "The Wealth of Nations."

Adam Smith was greatly surprised to know why water which is so very essential and useful to life has such a low price (indeed no price), while diamonds which are quite unnecessary, have such a high price. He could not resolve this water-diamond paradox. But modern economists can solve it with the aid of the concept of marginal utility.

According to the modern economists, the total utility of a commodity does not determine the price of a commodity and it is the marginal utility which is crucially important determinant of price. Now, the water is available in abundant quantities so that its relative marginal utility is very low or even zero. Therefore, its price is low or zero. On the other hand, the diamonds are scarce and therefore their relative marginal utility is quite high and this is the reason why their prices are high.

Prof. Samuelson explains this paradox of value in the following words:

The more there is of a commodity, the less the relative desirability of its last little unit becomes, even though its total usefulness grows as we get more of the commodity. So, it is obvious why a large amount of water has a low price or why air is actually a free good despite its vast usefulness. The many later units pull down the market value of all units.

Besides, the Marshallian concept of consumer's surplus is based on the principle of diminishing marginal utility.

Consumer's Equilibrium: Principle of Equi-Marginal Utility:

Principle of equi-marginal utility occupies an important place in cardinal utility analysis. It is through this principle that consumer's equilibrium is explained. A consumer has a given income which he has

to spend on various goods he wants. Now, the question is how he would allocate his given money income among various goods, that is to say, what would be his equilibrium position in respect of the purchases of the various goods. It may be mentioned here that consumer is assumed to be 'rational', that is, he carefully calculates utilities and substitutes one good for another so as to maximise his utility or satisfaction.

Suppose there are only two goods X and Y on which a consumer has to spend a given income. The consumer's behaviour will be governed by two factors first, the marginal utilities of the goods and secondly, the prices of two goods. Suppose the prices of the goods are given for the consumer.

The law of equi-marginal utility states that the consumer will distribute his money income between the goods in such a way that the utility derived from the last rupee spent on each good is equal. In other words, consumer is in equilibrium position when marginal utility of money expenditure on each good is the same. Now, the marginal utility of money expenditure on a good is equal to the marginal utility of a good divided by the price of the good. In symbols,

$$MU_m = MU_x / P_x$$

Where MU_m is marginal utility of money expenditure and MU_x is the marginal utility of X and P_x is the price of X. The law of equi-marginal utility can therefore be stated thus: the consumer will spend his money income on different goods in such a way that marginal utility of money expenditure on each good is equal. That is, consumer is in equilibrium in respect of the purchases of two goods X and Y when

$$MU_x / P_x = MU_y / P_y$$

Now, if MU_x / P_x and MU_y / P_y are not equal and MU_x / P_x is greater than MU_y / P_y , then the consumer will substitute good X for good Y. As a result of this substitution, the marginal utility of good X will fall and marginal utility of good Y will rise. The consumer will continue substituting good X for good Y until MU_x / P_x becomes equal to MU_y / P_y . When MU_x / P_x becomes equal to MU_y / P_y the consumer will be in equilibrium.

But the equality of MU_x / P_x with MU_y / P_y can be achieved not only at one level but at different levels of expenditure. The question is how far does a consumer go in purchasing the goods he wants. This is determined by the size of his money income. With a given income and money expenditure a rupee has a certain utility for him: this utility is the marginal utility of money to him.

Since the law of diminishing marginal utility applies to money income also, the greater the size of his money income the smaller the marginal utility of money to him. Now, the consumer will go on purchasing goods until the marginal utility of money expenditure on each good becomes equal to the marginal utility of money to him.

Thus, the consumer will be in equilibrium when the following equation holds good:

$$MU_x / P_x = MU_y / P_y = MU_m$$

Where MU_m is marginal utility of money expenditure (that is, the utility of the last rupee spent on each good).

If there are more than two goods on which the consumer is spending his income, the above equation must hold good for all of them. Thus

$$MU_x / P_x = MU_y / P_y = \dots\dots\dots = MU_m$$

Let us illustrate the law of equi-marginal utility with the aid of an arithmetical table given below:

Table 7.2. Marginal Utility of Goods X and Y

Units	MU_x (Utils)	MU_y (Utils)
1	20	24
2	18	21
3	16	18
4	14	15
5	12	9
6	10	3

Let the prices of goods X and Y be Rs. 2 and Rs. 3 respectively. Reconstructing the above table by dividing marginal utilities (MU) of X by Rs. 2 and marginal utilities (MU) of Y by Rs. 3 we get the Table 7.3.

Table 7.3. Marginal Utility of Money Expenditure

Units	$\frac{MU_x}{P_x}$	$\frac{MU_y}{P_y}$
1	10	8
2	9	7
3	8	6
4	7	5
5	6	3
6	5	1

Suppose a consumer has money income of Rs. 24 to spend on the two goods. It is worth noting that in order to maximise his utility the consumer will not equate marginal utilities of the goods because prices of the two goods are different. He will equate the marginal utility of the last rupee (i.e. marginal utility of money expenditure) spent on these two goods.

In other words, he will equate MU_x / P_x with MU_y / P_y while spending his given money income on the two goods. By looking at the Table 7.3 it will become clear that MU_x / P_x is equal to 5 utils when the consumer purchases 6 units of good X and MU_y / P_y is equal to 5 utils when he buys 4 units of good Y. Therefore, consumer will be in equilibrium when he is buying 6 units of good X and 4 units of good Y and will be spending $(Rs. 2 \times 6 + Rs. 3 \times 4) = Rs. 24$ on them that are equal to consumer's given income. Thus, in the equilibrium position where the consumer maximises his utility.

$$MU_x / P_x = MU_y / P_y = MU_m$$

$$10/2 = 15/3 = 5$$

Thus, marginal utility of the last rupee spent on each of the two goods he purchases is the same, that is, 5 utils.

Consumers' equilibrium is graphically portrayed in Fig. 7.2. Since marginal utility curves of goods slope downward, curves depicting MU_x / P_x and MU_y / P_y also slope downward. Thus, when the consumer is buying OH of X and OK of Y, then

$$MU_x / P_x = MU_y / P_y = MU_m$$

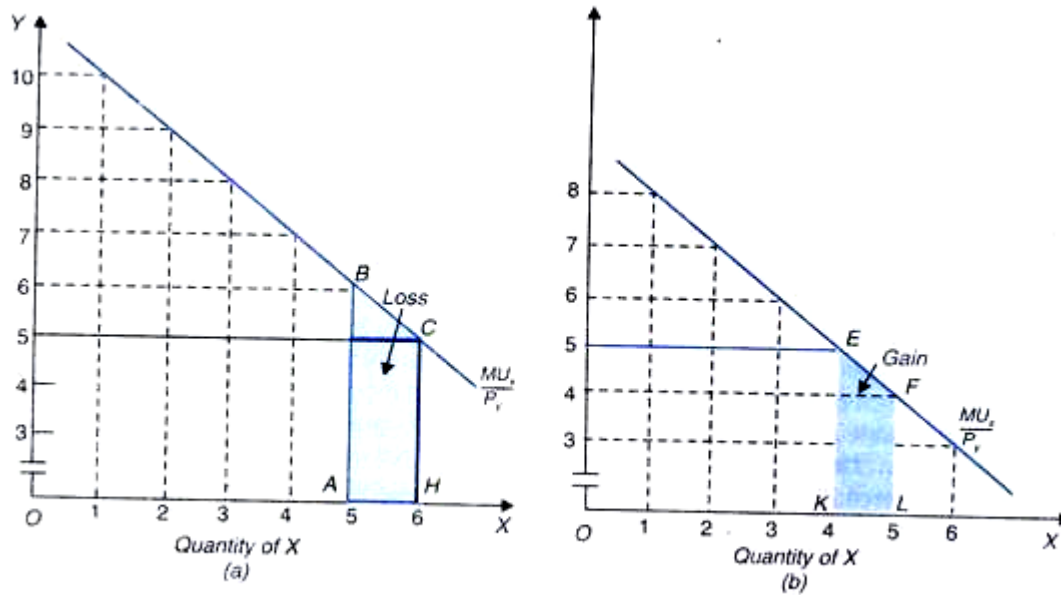


Fig. 7.2. Equi-Marginal Utility Principle and Consumer's Equilibrium

Therefore, the consumer is in equilibrium when he is buying 6 units of X and 4 units of Y. No other allocation of money expenditure will yield him greater utility than when he is buying 6 units of commodity X and 4 units of commodity Y. Suppose the consumer buys one unit less of good X and one unit more of good Y.

This will lead to the decrease in his total utility. It will be observed from Figure 7.2 (a) that the consumption of 5 units instead of 6 units of commodity X means a loss in satisfaction equal to the shaded area ABCH and from Fig. 7.2(b) it will be seen that consumption of 5 units of commodity Y instead of 4 units will mean gain in utility equal to the shaded area KEFL. It will be noticed that with this rearrangement of purchases of the two goods, the loss in utility ABCH exceeds gain in utility KEFL.

Thus, his total satisfaction will fall as a result of this rearrangement of purchases. Therefore, when the consumer is making purchases by spending his given income in such a way that $MU_x / P_x = MU_y / P_y$, he will not like to make any further changes in the basket of goods and will therefore be in equilibrium situation by maximizing his utility.

Limitations of the Law of Equi-Marginal Utility:

Like other laws of economics, law of equi-marginal utility is also subject to various limitations. This law, like other laws of economics, brings out an important tendency among the people. This is not necessary that all people exactly follow this law in the allocation of their money income and therefore all may not obtain maximum satisfaction.

This is due to the following reasons:

(1) For applying this law of equi-marginal utility in the real life, consumer must weigh in his mind the marginal utilities of different commodities. For this he has to calculate and compare the marginal utilities obtained from different commodities.

But it has been pointed out that the ordinary consumers are not so rational and calculating. Consumers are generally governed by habits and customs. Because of their habits and customs they

spend particular amounts of money on different commodities, regardless of whether the particular allocation maximises their satisfaction or not.

(2) For applying this law in actual life and equate the marginal utility of the last rupee spent on different commodities, the consumers must be able to measure the marginal utilities of different commodities in cardinal terms. However, this is easier said than done. It has been said that it is not possible for the consumer to measure utility cardinally.

Being a state of psychological feeling and also there being no objective units with which to measure utility, it is cardinally immeasurable. It is because of the immeasurability of utility in cardinal terms that the consumer's behaviour has been explained with the help of ordinal utility by J.R. Hicks and R.G.D. Allen.

(3) Another limitation of the law of equi-marginal utility is found in case of indivisibility of certain goods. Goods are often available in large indivisible units. Because the goods are indivisible, it is not possible to equate the marginal utility of money spent on them. For instance, in allocating money between the purchase of car and foodgrains, marginal utilities of the last rupee spent on them cannot be equated.

An ordinary car costs about Rs. 300,000 and is indivisible, whereas foodgrains are divisible and money spent on them can be easily varied. Therefore, the marginal utility of rupee obtained from cars cannot be equalised with that obtained from foodgrains. Thus, indivisibility of certain goods is a great obstacle in the way of equalisation of marginal utility of a rupee from different commodities.

Derivation of Demand Curve and the Law of Demand:

We now turn to explain how the demand curve and law of demand is derived in the marginal utility analysis. As stated above, the demand curve or law of demand shows the relationship between price of a good and its quantity demanded. Marshall derived the demand curves for goods from their utility functions.

It should be further noted that in his utility analysis of demand Marshall assumed the utility functions of different goods to be independent of each other. In other words, Marshallian technique of deriving demand curves for goods from their utility functions rests on the hypothesis of additive utility functions, that is, utility function of each good consumed by a consumer does not depend on the quantity consumed of any other good.

As has already been noted, in case of independent utilities or additive utility functions, the relations of substitution and Complementarity between goods are ruled out. Further, in deriving demand curve or law of demand Marshall assumes the marginal utility of money expenditure (MU_m) in general to remain constant.

We now proceed to derive demand curve from the law of equi-marginal utility. Consider the case of a consumer who has a certain given income to spend on a number of goods. According to the law of equi-marginal utility, the consumer is in equilibrium in regard to his purchases of various goods when marginal utilities of the goods are proportional to their prices.

Thus, the consumer is in equilibrium when he is buying the quantities of the two goods in such a way that satisfies the following proportionality rule:

$$MU_x / P_x = MU_y / P_y = MU_m$$

Where MU_m stands for marginal utility of money income in general.

With a certain given income for money expenditure the consumer would have a certain marginal utility of money (MU_m) in general. In order to attain the equilibrium position, according to the above proportionality rule, the consumer will equalise his marginal utility of money (expenditure) with the ratio of the marginal utility and the price of each commodity he buys.

It follows therefore that a rational consumer will equalise the marginal utility of money (MU_m) with MU_x / P_x of good X, with MU_m / P_y of good Y and so on. Given Ceteris Paribus assumption, suppose price of good X falls. With the fall in the price of good X, the price of good Y, consumer's income and tastes remaining unchanged, the equality of the MU_x / P_x with MU_y / P_y and MU_m in general would be disturbed.

With the lower price than before MU_x / P_x will be greater than MU_y / P_y or MU_m (It is assumed of course that the marginal utility of money does not change as a result of the change in the price of one good). Then, in order to restore the equality, marginal utility of X or MU_x must be reduced. And the marginal utility of X or MU_x can be reduced only by the consumer buying more of the good X.

It is thus clear from the proportionality rule that as the price of a good falls, its quantity demanded will rise, other things remaining the same. This will make the demand curve for a good downward sloping. How the quantity purchased of a good increases with the fall in its price and also how the demand curve is derived in the cardinal utility analysis is illustrated in Fig. 7.3.



CAREER STUDY
The Learning App

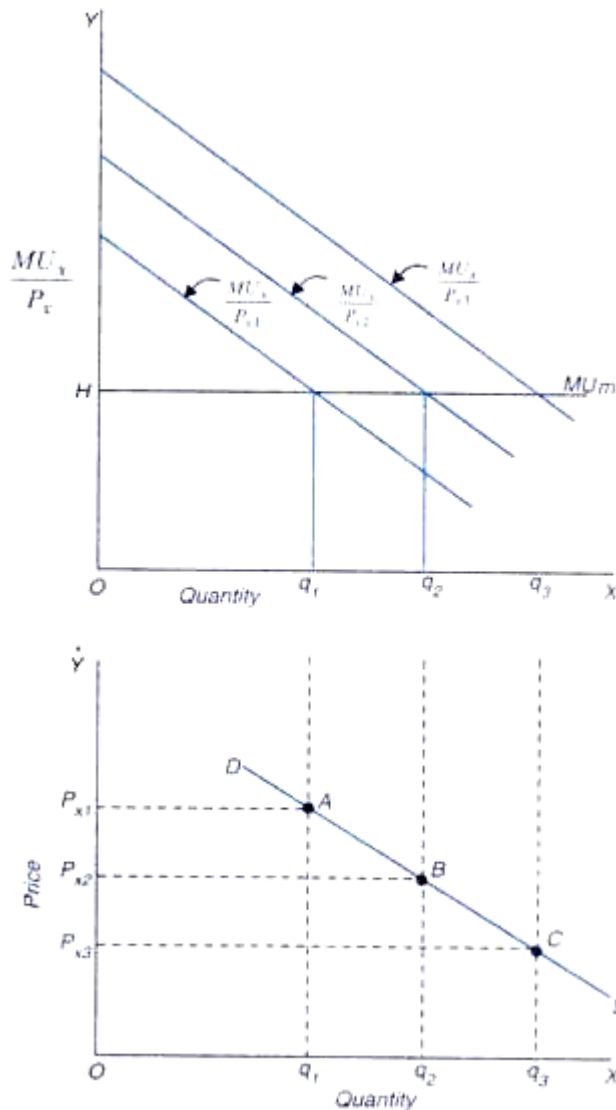


Fig. 7.3. Derivation of Demand Curve

In the upper portion of Fig. 7.3, on the Y-axis MU_x / P_x is shown and on the X-axis the quantity demanded of good X is shown. Given a certain income of the consumer, marginal utility of money in general for him is equal to OH. The consumer is buying Oq_1 of good X when price is P_{x1} since at the quantity Oq_1 of X, marginal utility of money OH is equal to MU_x / P_{x1} .

Now, when price of good X falls to P_{x2} . The curve will shift upward to the new position MU_x / P_{x2} . In order to equate marginal utility of money (OH) with the new MU_x / P_{x2} the consumer increases the quantity demanded to Oq_2 . Thus, with the fall in price of good X to P_{x2} , the consumer buys more of it.

It should be noted that no account is taken of the increase in real income of the consumer as a result of fall in price of good X. This is because if change in real income is taken into account, then marginal utility of money will also change and this would have an effect on the purchases of goods. Marginal utility of money can remain constant in two cases. First, when the elasticity of marginal utility curve (price elasticity of demand) is unity so that even with increase in the purchase of a commodity following the fall in price, the money expenditure made on it remains the same.

Second, marginal utility of money will remain approximately constant for small changes in price of unimportant goods, that is, goods which account for negligible part of consumer's budget. In case of these unimportant goods increase in real income following the fall in price is negligible and therefore can be ignored.

At the bottom of Figure 7.3 the demand curve for X is derived. In this lower panel, price is measured on the Y-axis. As in the upper panel, the X-axis represents quantity. When the price of good X is P_{x1} , the relevant curve of MU/P is MU_x / P_{x1} which is shown in the upper panel. With MU_x / P_{x1} , he buys Oq_1 of good X. Now, in the lower panel this quantity Oq_1 is directly shown to be demanded at the price P_{x2} .

When price of X falls to P_{x2} , the curve of MU/P shifts upward to the new position MU_x / P_{x2} . With MU_x / P_{x2} the consumer buys Oq_2 of X. This quantity Oq_2 is directly shown to be demanded at price P_{x2} lower panel. Similarly, by varying price further we can know the quantity demanded at other prices. Thus, by joining points A, B and C we obtain the demand curve DD. The demand curve DD slopes downward which shows that as price of a good falls, its quantity purchased rises.

Critical Evaluation of Marshall's Cardinal Utility Analysis:

Cardinal utility analysis of demand which we have studied above has been criticised on various grounds.

The following shortcomings and drawbacks of cardinal utility analysis have been pointed out:

(1) Cardinal measurability of utility is unrealistic:

Cardinal utility analysis of demand is based on the assumption that utility can be measured in absolute, objective and quantitative terms. In other words, it is assumed in this analysis that utility is cardinally measurable. According to this, how much utility a consumer obtains from goods can be expressed or stated in cardinal numbers such as 1, 2, 3, 4 and so forth. But in actual practice utility cannot be measured in such quantitative or cardinal terms.

Since utility is a psychic feeling and a subjective thing, it cannot be measured in quantitative terms. In real life, consumers are only able to compare the satisfactions derived from various goods or various combinations of the goods. In other words, in the real life consumer can state only whether a good or a combination of goods gives him more or less, or equal satisfaction as compared to another. Thus, economists like J.R. Hicks are of the opinion that the assumption of cardinal measurability of utility is unrealistic and therefore it should be given up.

(2) Hypothesis of independent utilities is wrong:

Utility analysis also assumes that utilities derived from various goods are independent. This means that the utility which a consumer derives from a good is the function of the quantity of that good and of that good alone. In other words, the assumption of independent utilities implies that the utility which a consumer obtains from a good does not depend upon the quantity consumed of other goods; it depends upon the quantity purchased of that good alone.

On this assumption, the total utility which a person gets from the whole collection of goods purchased by him is simply the total sum of the separate utilities of various goods. In other words, utility functions are additive.

Neo-classical economists such as Jevons, Menger, Walras and Marshall considered that utility functions were additive. But in the real life this is not so. In actual life the utility or satisfaction

derived from a good depends upon the availability of some other goods which may be either substitutes for or complementary with each other. For example, the utility derived from a pen depends upon whether ink is available or not.

On the contrary, if you have only tea, then the utility derived from it would be greater but if along with tea you also have the coffee, then the utility of tea to you would be comparatively less. Whereas pen and ink are complements with each other, tea and coffee are substitutes for each other.

It is thus clear that various goods are related to each other in the sense that some are complements with each other and some are substitutes for each other. As a result of this, the utilities derived from various goods are interdependent, that is, they depend upon each other. Therefore, the utility obtained from a good is not the function of its quantity alone but also depends upon the existence or consumption of other related goods (complements or substitutes).

It is thus evident that the assumption of the independence of utilities by Marshall and other supporters of marginal utility analysis is a great defect and shortcoming of their analysis. As we shall see below, the hypothesis of independent utilities along with the assumption of constant marginal utility of money reduces the validity of Marshallian demand theorem to the one- commodity model only.

(3) Assumption of constant marginal utility of money is not valid:

An important assumption of cardinal utility analysis is that when a consumer spends varying amount on a good or various goods or when the price of a good changes, marginal utility of money remains unchanged. But in actual practice this is not correct. As a consumer spends his money income on the goods, money income left with him declines.

With the decline in money income of the consumer as a result of increase in his expenditure on goods, the marginal utility of money to him rises. Further, when price of a commodity changes, the real income of the consumer also changes. With this change in real income, marginal utility of money will change and this would have an effect on the demand for the good in question, even though the total money income available with the consumer remains the same.

But utility analysis ignores all this and does not take cognizance of the changes in real income and its effect on demand for goods following the change in price of a good. As we shall see below, it is because of the assumption of constant marginal utility of money that Marshall ignored the income effect of the price change which prevented Marshall from understanding the composite character of the price effect (that is, price effect is the sum of substitution effect and income effect).

Moreover, as we shall see later, the assumption of constant marginal utility of money together with the hypothesis of independent utilities renders the Marshall's demand theorem to be valid in case of one commodity. Further, it is because of the constant marginal utility of money and therefore the neglect of the income effect by Marshall that he could not explain Giffen Paradox.

According to Marshall, utility from a good can be measured in terms of money (that is, how much money a consumer is prepared to sacrifice for a good). But, to be able to measure utility in terms of money marginal utility of money itself should remain constant. Therefore, assumption of constant marginal utility of money is very crucial to Marshallian demand analysis. On the basis of constant marginal utility of money Marshall could assert that "utility is not only measurable in principle" but also "measurable in fact".

But, as we shall see below, in case a consumer has to spread his money income on a number of goods, there is a necessity for revision of marginal utility of money with every change in price of a good. In other words, in a multi-commodity model marginal utility of money does not remain invariant or constant.

Now, when it is realised that marginal utility of money does not remain constant, then Marshall's belief that utility is 'measurable in fact' in terms of money does not hold good. However, if in marginal utility analysis, utility is conceived only to be 'measurable in principle' and not in fact, then it practically gives up cardinal measurement of utility and comes near to the ordinal measurement of utility.

(4) Marshallian demand theorem cannot genuinely be derived except in a one commodity case:

J.R. Hicks and Tapas Majumdar have criticised Marshallian utility analysis on the ground that "Marshallian demand theorem cannot genuinely be derived from the marginal utility hypothesis except in a one-commodity model without contradicting the assumption of constant marginal utility of money. In other words, Marshall's demand theorem and constant marginal utility of money are incompatible except in a one commodity case. As a result, Marshall's demand theorem cannot be validity derived in the case when a consumer spends his money on more than one good.

In order to know the truth of this assertion consider a consumer who has a given amount of money income to spend on some goods with given prices? According to utility analysis, the consumer will be in equilibrium when he is spending money on goods in such a way that the marginal utility of each good is proportional to its price. Let us assume that, in his equilibrium position, consumer is buying q_1 quantity of a good X at a price P_1 . Marginal utility of good X, in his equilibrium position, will be equal to its price p_1 multiplied by the marginal utility of money (which, in Marshallian utility analysis, serves as the unit of measurement).

Thus, in the equilibrium position, the following equation will be fulfilled:

$$MU_x / = MU_m \times p_1$$

Since the consumer is buying q_1 quantity of good X at price P_1 , he will be spending $P_1 Q_1$ amount of money on it. Now, suppose that the price of good X rises from p_1 to p_2 . With this rise in price of X, all other things remaining the same, the consumer will at once find himself in disequilibrium state, for the marginal of good X will now be less than the higher price p_2 multiplied by the marginal utility of money (MU_m) which is assumed to remain unchanged and constant. Thus, now there will be

$$MU_x < MU_m \cdot P_2$$

In order to restore his equilibrium, the consumer will buy less of good X so that the marginal utility of good X (MU_x) would rise and become equal to the product of p_2 and MU_m . Suppose in this new equilibrium position, he is buying q_2 of good X which will be less than q_1 . With this he will now be spending $p_2 q_2$ amount of money on good X. Now the important thing to see is that whether his new expenditure $p_2 q_2$ on good X is equal to, smaller or greater than $P_1 q_1$.

This depends upon the elasticity of marginal utility curve i.e., price elasticity of demand. If the elasticity of marginal utility curve of good X is unity, then the new expenditure on good X (i.e. $p_2 q_2$) after the rise in its price from p_1 to p_2 will be equal to the initial expenditure $p_1 q_1$. When the monetary expenditure made on the good remains constant as a result of change in price, then the Marshallian theory is valid.

But constant monetary expenditure following a price change is only a rare phenomenon. However, the Marshallian demand theory breaks down when the new expenditure p_2q_2 after the rise in price, instead of being equal is smaller or greater than the initial expenditure p_1q_1 .

If elasticity of marginal utility curve is greater than one (that is, price demand for the good is elastic), then the new expenditure p_2q_2 , after the rise in price from p_1 to p_2 , will be less than the initial expenditure p_1q_1 . On the other hand, if the elasticity of marginal utility curve is less than unity, then the new expenditure p_2q_2 after the rise in price will be greater than the initial expenditure p_1q_1 .

Now, if the new expenditure p_2q_2 on good X is less than the initial expenditure p_1q_1 or it, it means more money will be left with the consumer to spend on goods other than X. And if the new expenditure p_2q_2 on good X is greater than the initial expenditure p_1q_1 on it, then less money would be left with him to spend on goods other than X.

In order that the consumer spends the entire amount of money available with him, then in case of new expenditure p_2q_2 on good X being smaller or greater than initial expenditure p_1q_1 on it, the expenditure on goods other than X and therefore consumer's demand for them will change.

But in Marshallian theoretical framework, this further adjustment in consumer's expenditure on goods other than X can occur only if the unit of utility measurement, that is, the marginal utility of money revised or changed. But Marshall assumes marginal utility of money to remain constant.

Thus, we see that marginal utility of money cannot be assumed to remain constant when the consumer has to spread his money income on a number of goods. In case of more than one good, Marshallian demand theorem cannot be genuinely derived while keeping the marginal utility of money constant.

If, in Marshallian demand analysis, this difficulty is avoided "by giving up the assumption of constant marginal utility of money, then money can no longer provide the measuring rod, and we can no longer express the marginal utility of a commodity in units of money. If we cannot express marginal utility in terms of common numeraire (which money is defined to be) the cardinality of utility would be devoid of any operational significance.

Only in case there is one good on which the consumer has to spend his money, Marshallian demand theorem can be validity derived. To conclude, in the words of Majumdar, "Except in a strictly one-commodity world, therefore, the assumption of a constant marginal utility of money would be incompatible with the Marshallian demand theorem.

Without the assumption of an invariant unit of measurement, the assertion of measurability would be entirely meaningless. The necessity and the possibility of revision of the unit of utility measurement, following every change in price, had been assumed away in Marshallian theory under the cover of 'other things remaining the same' clause."

(6) Cardinal utility analysis does not split up the price effect into substitution and income effects: The third shortcoming of the cardinal utility analysis is that it does not distinguish between the income effect and the substitutional effect of the price change.

We know that when the price of a good falls, the consumer becomes better off than before, that is, a fall in price of a good brings about an increase in the real income of the consumer. In other words, if with the fall in price the consumer purchases the same quantity of the good as before, then he would be left with some income.

With this income he would be in a position to purchase more of this good as well as other goods. This is the income effect of the fall in price on the quantity demanded of a good. Besides, when the price of a good falls, it becomes relatively cheaper than other goods and as a result the consumer is induced to substitute that good for others. This results in increase in quantity demanded of that good. This is the substitution effect of the price change on the quantity demanded of the good.

With the fall in price of a good, the quantity demanded of it rises because of income effect and substitution effect. But cardinal utility analysis does not make clear the distinction between the income and the substitution effects of the price change. In fact, Marshall and other exponents of marginal utility analysis ignored income effect of the price change by assuming the constancy of marginal utility of money. Thus, according to Tapas Majumdar, "the assumption of constant marginal utility of money obscured Marshall's insight into the truly composite character of the unduly simplified price-demand relationship".

They explained the changes in demand as a result of change in the price of a good on the basis of substitution effect on it. Thus, marginal utility analysis does not tell us about how much quantity demanded increases due to income effect and how much due to substitution effect as a result of the fall in price of a good. J R Hicks rightly remarks, "that distinction between income effect and substitution effect of a price change is accordingly left by the cardinal theory as an empty box which is crying out to be filled. In the same way, Tapas Majumdar says, "The efficiency and precision with which the Hicks-Allen approach can distinguish between the income and substitution effects of a price change really leaves the cardinal argument in a very poor state indeed.

(7) Marshall could not explain Giffen Paradox:

By not visualizing the price effect as a combination of substitution and income effects and ignoring the income effect of the price change, Marshall could not explain the Giffen Paradox. He treated it merely as an exception to his law of demand. In contrast to it, indifference curve analysis has been able to explain satisfactorily the Giffen good case.

According to indifference curve analysis, in case of a Giffen Paradox or the Giffen good negative income effect of the price change is more powerful than substitution effect so that when the price of a Giffen good falls the negative income effect outweighs the substitution effect with the result that quantity demanded of it falls.

Thus in case of a Giffen good, quantity demanded varies directly with the price and the Marshall's law of demand does not hold good. It is because of the constant marginal utility of money and therefore the neglect of the income effect of price change that Marshall could not explain why the quantity demanded of the Giffen good falls when its price falls and rises when its price rises. This is a serious lacuna in Marshallian's utility analysis of demand.

(8) Marginal utility analysis assumes too much and explains too little:

Marginal utility analysis is also criticised on the ground that it takes more assumptions and also more severe ones than those of ordinal utility analysis of indifference curve technique. Marginal utility analysis assumes, among others, that utility is cardinally measurable and also that marginal utility of money remains constant. Hicks-Allen's indifference curve analysis does not take these assumptions and even then it is not only able to deduce all the theorems which cardinal utility analysis can but also deduces a more general theorem of demand.

In other words, indifference curve analysis explains not only that much as cardinal utility analysis does but even goes further and that too with fewer and less severe assumptions. Taking less severe

assumption of ordinal utility and without assuming constant marginal utility of money, analysis is able to arrive at the condition of consumer's equilibrium, namely, equality of marginal rate of substitution (MRS) with the price ratio between the goods, which is similar to the proportionality rule of Marshall. Further, since indifference curve analysis does not assume constant marginal utility of money, it is able to derive a valid demand theorem in a more than one commodity case.

In other words indifference curve analysis clearly explains why in case of Giffen goods quantity demanded increases with the rise in price and decreases with the fall in price. Indifference curve analysis explains even the case of ordinary inferior goods (other than Giffen goods) in a more analytical manner.

It may be noted that even if the valid demand is derived for the Marshallian hypothesis, it would still be rejected because "better hypothesis" of indifference preference analysis was available which can enunciate more general demand theorem (covering the case of Giffen goods) with fewer, less severe and more realistic assumptions.

Because of the above drawbacks, cardinal utility analysis has been given up in modern economic theory and demand is analysed with new approaches to demand theory.

What is Indifference Curve?

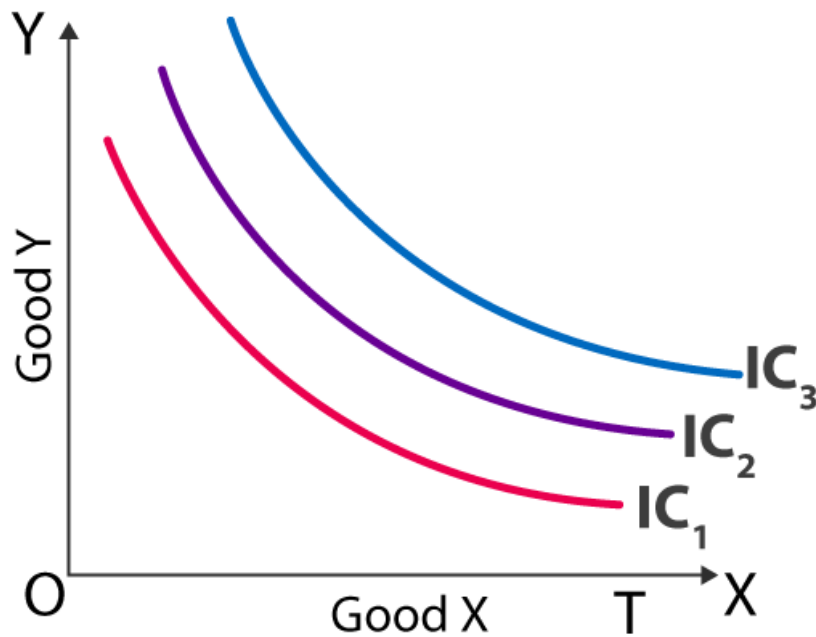
An indifference curve is a graphical representation of a combination of products that gives similar kind of satisfaction to a consumer thereby making them indifferent. Every point on the indifference curve shows that an individual or a consumer is indifferent between the two products as it gives him the same kind of utility.

Indifference Curve Analysis

The indifference curve analysis works on a simple graph having two-dimensional. Each individual axis indicates a single type of economic goods. If the graph is on the curve or line, then it means that the consumer has no preference for any goods, because all the goods have the same level of satisfaction or utility to the consumer. For instance, a child might be indifferent while having a toy, two comic books, four toy trucks and a single comic book.

Indifference Map

The Indifference Map refers to a set of Indifference Curves that reflects an understanding and gives an entire view of a consumer's choices. The below diagram shows an indifference map with three indifference curves.



Indifference Map

Concept of Budget Line (With Diagram) | Consumer's Equilibrium | Economics:

Suppose our consumer has got income of Rs. 50 to spend on goods X and Y. Let the price of the good X in market be Rs. 10 per unit and that of Y Rs. 5 per unit. If the consumer spends his whole income of Rs. 50 on good X, he would buy 5 units of X; if he spends his whole income of Rs. 50 on good Y he would buy 10 units of Y. If a straight line joining 5X and 10Y is drawn, we will get what is called the price line or the budget line.

This budget line shows all those combinations of two goods which the consumer can buy spending his given money income on the two goods at their given prices. A look at Fig. 8.14 shows that with Rs. 50 and the prices of X and Y being Rs. 10 and Rs. 5 respectively the consumer can buy 10Y and 0X, or 8Y and 2X, or 6Y and 4X, or 4Y and 6X etc.

In other words, he can buy any combination that lies on the budget line with his given money income and given prices of the goods. It should be carefully noted that any combination of goods as H(5Y and 4X) which lies above and outside the given budget line will be beyond the reach of the consumer.

But any combination lying within the budget line such as K(2X and 2Y) will be well within the reach of the consumer, but if he buys any such combination he will not be spending all his income of Rs. 50. Thus, with the assumption that whole of the given income is spent on the given goods and at given prices of them, the consumer has to choose from all those combinations which lie on the budget line.

It is clear from above that budget line graphically shows the budget constraint. The combinations of commodities lying to the right of the budget line are unattainable because income of the consumer is

not sufficient to be able to buy those combinations. Given his income and the prices of goods, the combinations of goods lying to the left of the budget line are attainable, that is, the consumer can buy any one of them.

It is also important to remember that the intercept OB on the Y-axis in Fig. 8.14 equals the amount of his entire income divided by the price of commodity Y. That is, $OB = M/P_Y$. Likewise, the intercept OL on the X-axis measures the total income divided by the price of commodity X. Thus $OL = M/P_X$.

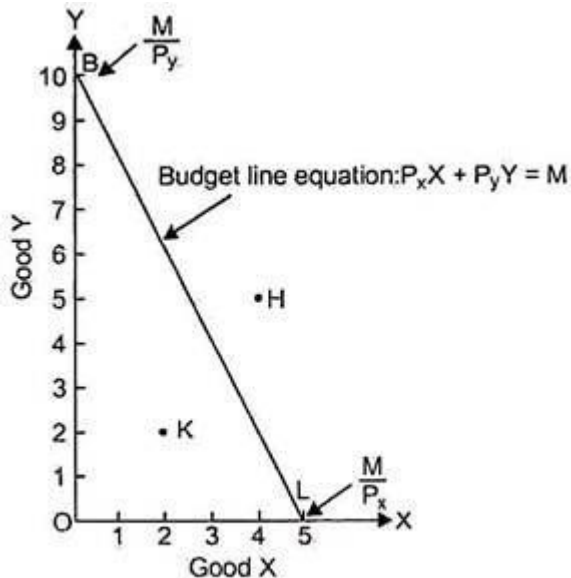


Fig. 8.14. Budget Line

The budget line can be written algebraically as follows:

$$P_X X + P_Y Y = M \dots (8.1)$$

ADVERTISEMENTS:

Where P_X and P_Y denote prices of goods X and Y respectively and M stands for money income. The above budget-line equation (8.1) implies that, given the money income of the consumer and prices of the two goods, every combination lying on the budget line will cost the same amount of money and can therefore be purchased with the given income. The budget line can be defined as a set of combinations of two commodities that can be purchased if whole of a given income is spent on them and its slope is equal to the negative of the price ratio.

Budget Space:

It should be carefully understood that the budget equation $P_X X + P_Y Y = M$ or $Y = M/P_Y - P_X/P_Y \cdot X$ depicted by the budget line in Fig. 8.14 only describes the budget line and not the budget space. A budget space shows a set of all commodity combinations that can be purchased by spending the whole or a part of the given income. In other words, budget space represents all those combinations of the commodities which the consumer can afford to buy, given the budget constraint.

Thus, the budget space implies the set of all combinations of two goods for which income spent on good X (i.e., $P_X X$) and income spent on good Y (i.e., $P_Y Y$) must exceed the given money income.

Therefore, we can algebraically express the budget space in the following form of inequality:

$$P_X X + P_Y Y < M \text{ or } M > P_X X + P_Y Y$$

The budget space has been graphically shown in Fig. 8.15 as the shaded area. The budget space is the entire area enclosed by the budget line BL and the two axes.

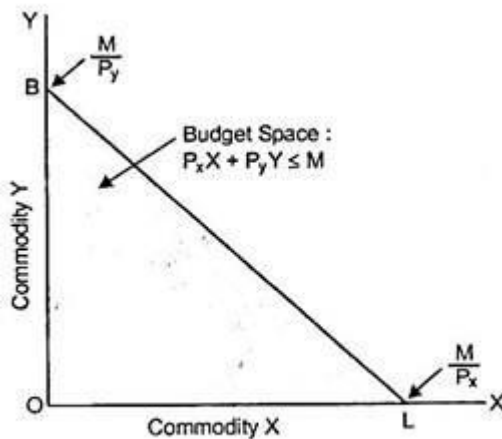


Fig. 8.15. Budget Space

Changes in Price and Shift in Budget Line:

Now, what happens to the price line if either the prices of goods change or the income changes. Let us first take the case of the changes in prices of the goods. This is illustrated in Fig. 8.16. Suppose the budget line in the beginning is BL, given certain prices of the goods X and Y and a certain income. Suppose the price of X falls, the price of Y and income remaining unchanged.

Now, with a lower price of X the consumer will be able to purchase more quantity of X than before with his given income. Let at the lower price of X, the given income purchases OL' of X which is greater than OL. Since the price of Y remains the same, there can be no change in the quantity purchased of good Y with the same given income and as a result there will be no shift in the point B. Thus, with the fall in the price of good X, the consumer's money income and the price of Y remaining constant, the price line will take the new position BL'.

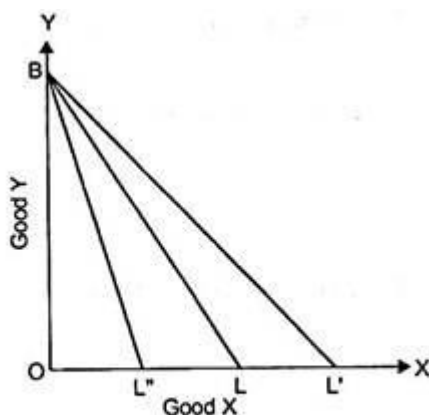


Fig. 8.16. Changes in Budget Line as a Result of Changes in Price Good X

Now, what will happen to the budget line (initial budget line BL) if the price of good X rises, the price of good Y and income remaining unaltered. With higher price of good X, the consumer can purchase smaller quantity of X, say OL'', than before. Thus, with the rise in price of X the price line will assume the new position BL''.

Fig. 8.17 shows the changes in the price line when the price of good Y falls or rises, with the price of X and income remaining the same. In this the initial budget line is BL.

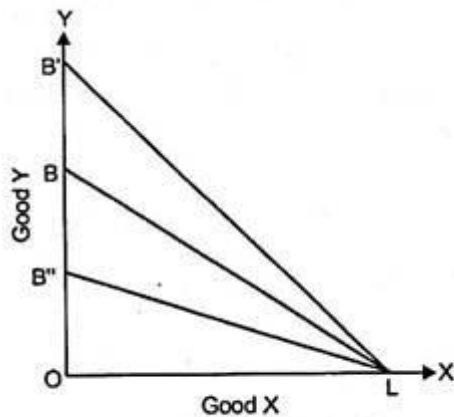


Fig. 8.17. Changes in Price Line as a Result of Changes in price of Good Y

With the fall in price of good Y, other things remaining unchanged, the consumer could buy more of Y with the given money income and therefore budget line will shift to LB'. Similarly, with the rise in price Y, other things being constant, the budget line will shift to LB''.

Changes in Income and Shifts in Budget line:

Now, the question is what happens to the budget Y line if the income changes, while the prices of goods remain the same. The effect of changes in income on the budget line is shown in Fig. 8.18. Let BL be the initial budget line, given certain prices of goods and income. If the consumer's income increases while the prices of both goods X and Y remain unaltered, the price line shifts upward (say, to B'L') and is parallel to the original budget line BL.

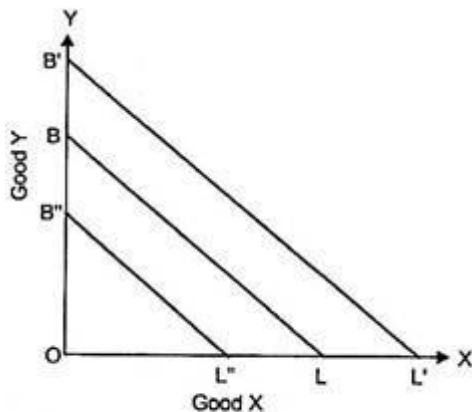


Fig. 8.18. Shifts in Budget Line as a Result of Changes in Income

This is because with the increased income the consumer is able to purchase proportionately larger quantity of good X than before if whole of the income is spent on X, and proportionately greater quantity of good Y than before if whole of the income is spent on Y. On the other hand, if the income of the consumer decreases, the prices of both goods X and

Y remaining unchanged, the budget line shifts downward (say, to B''L'') but remains parallel to the original price line BL. This is because a lower income will purchase a proportionately smaller quantity

of good X if whole of the income is spent Changes in Income on X and proportionately smaller quantity of good Y if whole of the income is spent on Y.

It is clear from above that the budget line will change if either the prices of goods change or the income of the consumer changes.

Thus, the two determinants of the budget line are:

- (a) The prices of goods, and
- (b) The consumer's income to be spent on the goods.

Slope of the Budget Line and Prices of two Goods:

It is also important to remember that the slope of the budget line is equal to the ratio of the prices of two goods. This can be proved with the aid of Fig. 8.14. Suppose the given income of the consumer is M and the given prices of goods X and Y are P_x and P_y respectively. The slope of the budget line BL is OB/OL . We intend to prove that slope OB/OL is equal to the ratio of the price of goods X and Y.

The quantity of good X purchased if whole of the given income M is spent on it is OL.

Therefore, $OL \times P_x = M$

$$OL = \frac{M}{P_x} \quad \dots(i)$$

Now, the quantity of good Y purchased if whole of the given income M is spent on it is OB.

Therefore, $OB \times P_y = M$

$$OB = \frac{M}{P_y} \quad \dots(ii)$$

Dividing (ii) by (i) we have,

$$\frac{OB}{OL} = \frac{\frac{M}{P_y}}{\frac{M}{P_x}} = \frac{M}{P_y} \times \frac{P_x}{M} = \frac{P_x}{P_y}$$

Thus, slope of budget line = $\frac{OB}{OL} = \frac{P_x}{P_y}$

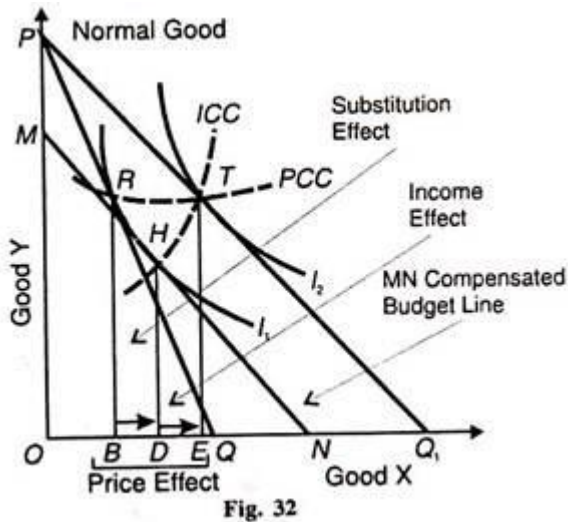
It is thus proved that the slope of the budget line BL represents the ratio of the prices of two goods.

The Hicksian Method:

Hicks has separated the substitution effect and the income effect from the price effect through compensating variation in income by changing the relative price of a good while keeping the real income of the consumer constant.

Suppose initially the consumer is in equilibrium at point R on the budget line PQ where the indifference curve I_1 , is tangent to it at point R in Figure 32. Let the price of good X fall. As a result, his budget line rotates outward to PQ' , where the consumer is in equilibrium at point T on the higher indifference curve I_2 .

The movement from R to T or B to E on the horizontal axis is the price effect of the fall in the price of X. With the fall in the price of X, the consumer's real income increases.



To make the compensating variation in income in order to isolate the substitution effect, the consumer's money income is reduced equivalent to PM of Y or Q_1N of X by drawing the budget line MN parallel to PQ_1 , so that it is tangent to the original indifference curve I_1 at point H.

The movement from the R to H on the I_1 curve is the substitution effect whereby the consumer increases his purchases of X from B to D on the horizontal axis by substituting X for Y because it is cheaper.

It may be noted that when there is a fall (or rise) in the price of good X, the substitution effect always leads to an increase (or decrease) in its quantity demanded. Thus the relation between price and quantity demanded being inverse, the substitution effect of a price change is always negative, real income being held constant.

This is known as the Slutsky Theorem, named after Slutsky who first stated it in relation to the Law of Demand.

To isolate the income effect from the price effect, return the income which was taken away from the consumer so that he goes back to the budget line PQ_1 , and is again in equilibrium at point T on the curve. The movement from point H on the lower indifference curve I_1 , to point T on the high indifference curve I_2 is the income effect of the fall in the price of good X. By the method of compensating variation in income, the real income of the consumer has increased as a result of the fall in the price of X.

The consumer purchases more of this cheaper good X thus moving on the horizontal axis from D to E. This is the income effect of the fall in the price of a normal good X. The income effect with respect to the price change for a normal good is negative. In the above case, the fall in the price of good X has increased the quantity demanded by DE via the increase in the real income of the consumer.

Thus the negative income effect DE of the fall in the price of good X strengthens the negative substitution effect BD for the normal good so that the total price effect BE is also negative, that is, a fall in the price of good X has led, on both counts, to the increase in its quantity demanded by BE.

This can be written in the form of the Slutsky equation thus:

Price Effect (-) BE = (-) BD (Substitution Effect + (-) DE (Income Effect).

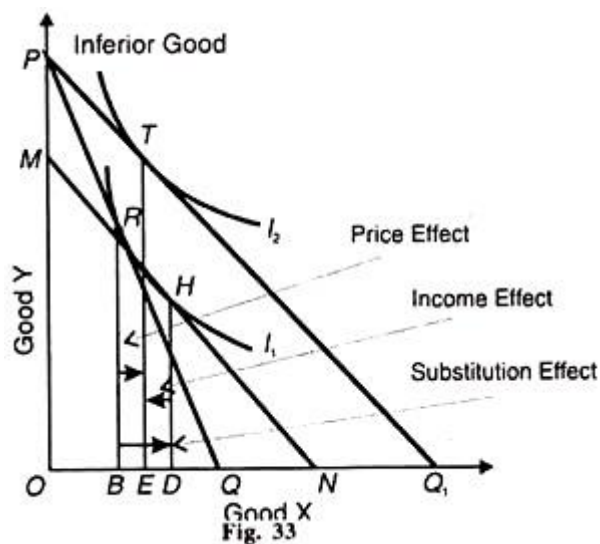
Substitution and Income Effects for an Inferior Good:

If X is an inferior good, the income effect of a fall in the price of X will be positive because as the real income of the consumer increases, less quantity of X will be demanded. This is so because price and quantity demanded move in the same direction.

On the other hand, the negative substitution effect will increase the quantity demanded of X. The negative substitution effect is stronger than the positive income effect in the case of inferior goods so that the total price effect is negative.

It means that when the price of the inferior good falls, the consumer purchases more of it due to compensating variation in income. The case of X as an inferior good is illustrated Figure 33. Initially, the consumer is in equilibrium at point R where the budget line PQ is tangent to the curve I_1 .

With the fall in the price of X, he moves to point T on the budget line PQ, at the higher indifference curve I_2 . His movement from R to T or from B to E on the horizontal axis is the price effect. By compensating variation in income, he is in equilibrium at point H on the new budget line MN along the original curve I_1 .



The movements from R to H on the I_1 curve is the substitution effect measured horizontally by BD of X. To isolate the income effect, return the increased real income to the consumer which was taken from him so that he is again at point T of the tangency of PQ, line and the curve I_2 . The movement from H to T is the income effect of the fall in the price of X and is measured by DE.

This income effect is positive because the fall in the price of the inferior good X leads, via compensating variation in income, to the decrease in its quantity demanded by DE. When the relation between price and quantity demanded is direct via compensating variation in income, the income effect is always positive.

In the case of an inferior good, the negative substitution effect is greater than the positive income effect so that the total price effect is negative. Thus Price Effect (-) $BE = (-) BD$ (Substitution Effect) + DE (Income Effect).

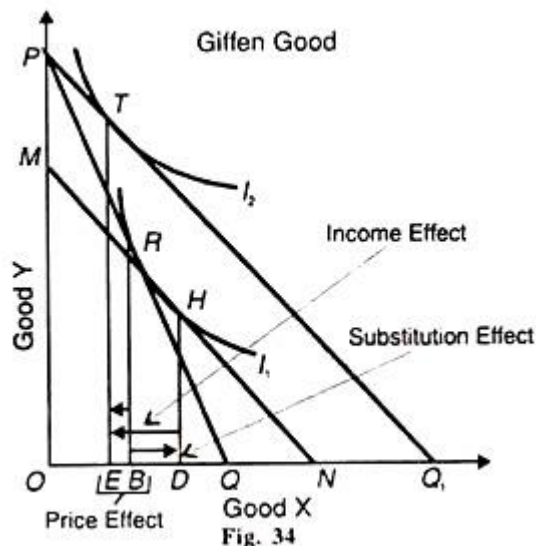
Substitution and Income Effects for a Giffen Good:

A strongly inferior good is a Giffen good, after Sir Robert Giffen who found that potatoes were an indispensable food item for the poor peasants of Ireland. He observed that in the famine of 1848, a rise in the price of potatoes led to an increase in their quantity demanded. Thereafter, a fall in the

price led to a reduction in their quantity demanded. This direct relation between prices a quantity demanded in relation to essential food items is called the Giffen paradox.

The reason for such a paradoxical tendency is that when the price of some food articles like bread of mass consumption rises, this is tantamount to a fall in the real income of the consumers who reduce their expenses on more expensive food items, as a result the demand for the bread increases.

Similarly, a fall in the price of bread raises the real income of consumers who substitute expensive food item for bread thereby reducing the demand of bread.



In the case of a Giffen good, the positive income effect is stronger than the negative substitution effect so that the consumer buys less of it when its price falls. This is illustrated in Figure 34. Suppose X is a Giffen good and the initial equilibrium point is R where the budget line PQ is tangent to the indifference curve I_1 .

Now the price of X falls and the consumer moves to point T of the tangency between the budget line PQ_1 and the curve I_2 . His movement from point R to T is the price effect whereby he reduces his consumption of X by BE.

To isolate the substitution effect, the increased real income due the fall in the price of X is withdrawn from the consumer by drawing the budget line MN parallel PQ. And tangent to the original curve I_1 at point H. As a result, he moves from point R to H along the curve. This is the negative substitution effect which leads him to buy BD more of X with the fall in its price, real income being constant. To isolate the income effect, when the income, which was taken away from the consumer, is returned to him, he moves from point H to T so that he reduces the consumption of X by a very large quantity DE.

This is the positive income effect because with the fall in the price of the Giffen good X, its quantity demanded is reduced by DE via compensating variation in income. In other words, it is positive with respect to price change, that is, the fall in the price of good X leads, via the income effect, to a decrease in the quantity demanded.

Thus in the case of a Giffen good, the positive income effect is stronger than the negative substitution effect so that the total price effect is positive. That is why, the demand curve for a Giffen

good has positive slope from left to right upwards. Thus the price effect $BE = DE$ (income effect) + $(-)$ BD (substitution effect).

According to Hicks, a giffen good must satisfy the following conditions:

ADVERTISEMENTS:

- (i) The consumer must spend a large part of his income on it;
- (ii) It must be an inferior good with strong income effect; and
- (iii) The substitution effect must be weak. But Giffen goods are very rare which may satisfy these conditions.

Conclusion:

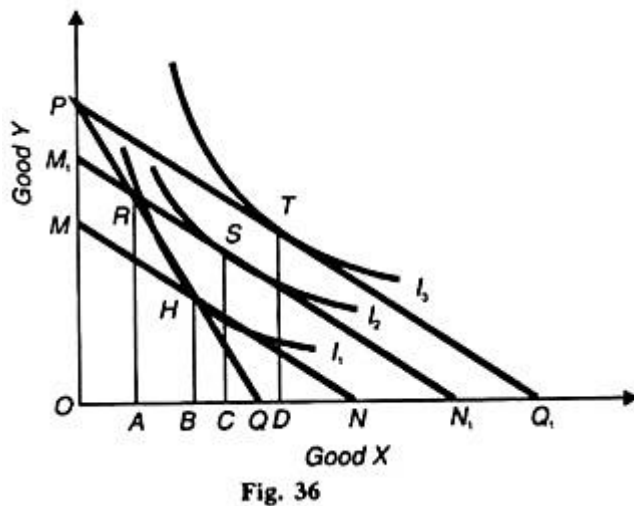
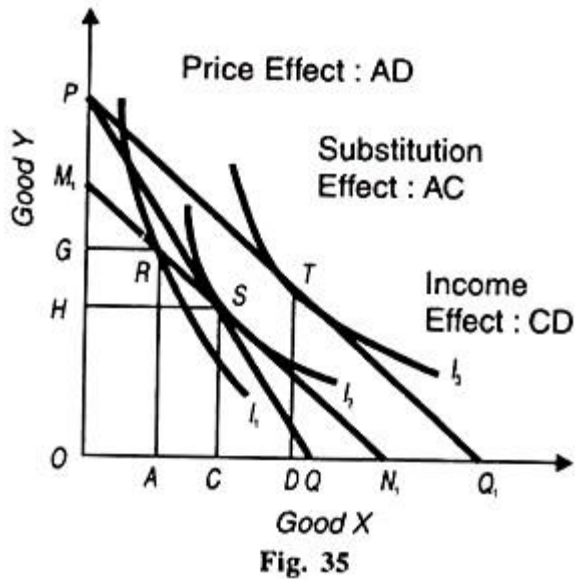
The Hicksian method of decomposing the price effect into the substitution and income effects is defective in that it lacks practical applicability because it is not possible to know exactly how much real income of the consumer should be changed in order to keep him on the original indifference curve. The Slutsky method tries to solve it by taking the apparent real income of the consumer.

The Slutsky Method:

Slutsky explained the income and substitution effects of the price effect by taking the apparent real income of the consumer constant. With the fall in the price of X when the real income of the consumer increases, it is adjusted in such a way that the consumer is in a position to have the same amount of X as before if he likes so that his apparent real income remains constant.

This is because he moves on to a higher indifference curve when the substitution effect takes place. It implies that the Slutsky effect corresponds with rotating budget lines about a point where they intersect each other, such as point R in Fig. 35.

Hicks call this the cost difference method in his A Revision of Demand Theory. Suppose the price of X falls but there is no change in the apparent real income of the consumer. So his increased income due to a price fall is taken from him in such a manner that he may be able to have the original combination of X and Y. The Slutsky effects are depicted in Fig. 35.



The consumer is in equilibrium at point R where the budget line PQ is tangent to I_1 curve. When the price of X falls, PQ_1 becomes the new budget line of the consumer where he is in equilibrium at point T on the indifference curve I_3 .

The movement of the consumer from point R to T or from A to D on the horizontal axis is the price effect. With the fall in the price of X, the increased income of the consumer is to be taken away through cost difference so that he may be able to buy the original combination R because it is assumed that his apparent real income remains constant.

For this, the line $M_1 N_1$ is drawn in such a manner that it passes through point R. This is equivalent to reducing the consumer's income by PM_X quantity of Y or $Q_1 N_1$ of X. But on this new budget line $M_1 N_1$ the consumer is in equilibrium at point S where this line touches the curve I_2 .

In reality, with X becoming cheaper relatively to Y, the consumer substitutes X for Y. Thus he sacrifices GH quantity of Y in order to have AC quantity of X. The movement of the consumer from point R to S or from A to C on the horizontal axis is the Slutsky Substitution Effect.

If the withdrawn income of the consumer is returned to him, he will move to point T on the curve I_3 . The movement from S to T or from CD on the horizontal axis is the income effect. Thus when the price of X falls, the movement from point R to T or AD is the price effect and the consumer buys AD

more of X. The first effect of the price effect is the substitution effect AC which moves the consumer from R to S. Its second effect is the income effect CD which moves him from point S to T.

Slutsky vs. Hicks—Separation of Income and Substitution Effects from Price Effect:

Hicks and Slutsky separate the income and substitution effects of the price effect in different ways. According to Hicks when the price of X falls, the real income of the consumer increases and he remains at the same indifference curve through the substitution effect on the basis of the compensating variation.

This is due to changes in the relative prices of X and Y so that the increased real income of the consumer is spent in such a manner that he is neither better off nor worse off than before. The consumer moves along the same indifference curve I_1 from one point of equilibrium to the other through the substitution effect, as shown in Figure 36.

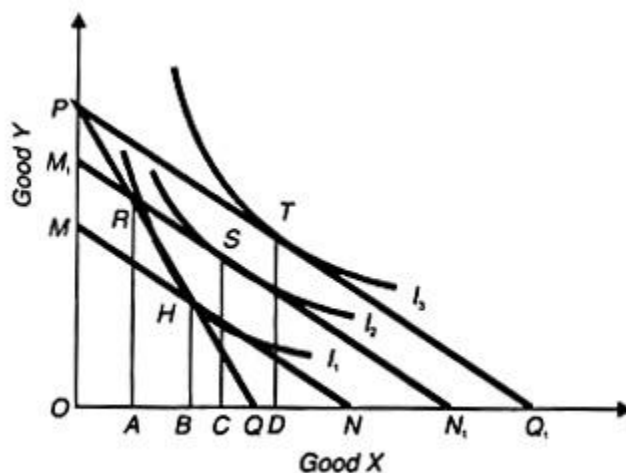


Fig. 36

On the other hand, the Slutsky substitution effect tells that with the fall in the price of good X, the consumer spends his increased income in such a manner as to buy the original quantities of A and Y if he so desires and there is no change in his apparent real income. But the substitution effect takes place when he moves to the higher indifference curve I_2 , as shown in Figure 36.

Figure 36 explains the separation of income and substitution effects of the price effect both in terms of the Hicksian method and the Slutsky method in the case of normal goods. Here PQ is the original budget line where R is the point of equilibrium on indifference curve I_1 , at which OA of X and RA of Y are bought by the consumer.

Now with the fall in the price of X, the budget line extends to PQ_1 and the consumer moves to point T on the higher indifference curve I_3 .

The movement from R to T is the price effect which shows that the consumer buys AD more of X, as a result of the fall in its price. The price effect is compounded of the substitution effect and the income effect which can be separated in two ways. Following Hicks, we draw a line MN parallel to PQ_1 so that the consumer is at the same real income level on the original indifference curve I_1 at point H on the budget line MN.

The movement from point R to H on the I_1 curve measures the substitution effect. As a result, the consumer buys AB more of X. The remaining increase of BD of X is the result of the income effect from H to T. In terms of the Slutsky method, a new budget line $M_1 N_1$ is drawn parallel to PQ_1 in such

a way that the apparent real income of the consumer remains the same even after the fall in the price of X. If $M_1 N_1$ passes through point R, the consumer has the same money income to buy combination R as he was buying at the old budget line PQ.

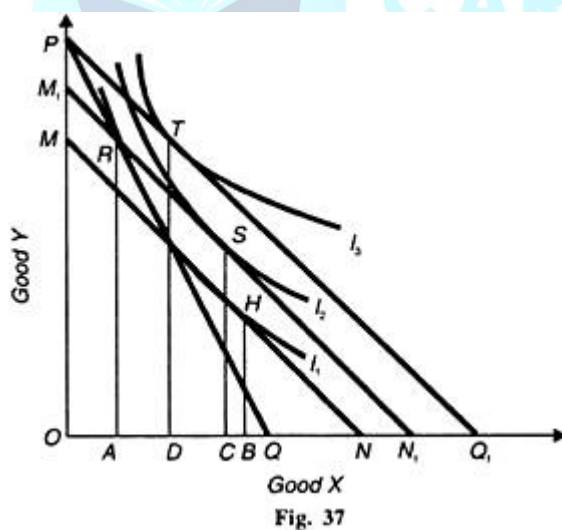
But in reality the consumer prefers the combination S to combination R on the budget line $M_1 N_1$, because point S lies on the budget line which is tangent to a higher indifference curve I_2 than point R which lies on a lower indifference curve I_1 . The movement from R to S is the Slutsky substitution effect.

As a result, the consumer buys AC more of X and the movement from S to T or CD of X is the income effect.

Figure 36 also reveals the differences between the two methods of measuring the substitution and income effects. The Hicksian substitution effect is smaller than the Slutsky substitution effect by BC quantity of X. On the other hand, the Hicksian income effect BD is greater than the Slutsky income effect CD.

X as an Inferior Good. If X is an inferior good, the income and substitution effects of the price effect when the price of X falls can be explained with the help of Hicks and Slutsky methods. In Figure 37, the movement of the consumer from R to T or A to D on the horizontal axis is the price effect from the points of view of Hicks and Slutsky.

This movement from R to H on the same indifference curve I_1 , is due to the Hicksian substitution effect while the movement from R to S is in accordance with the Slutsky substitution effect on the higher curve I_2 .



When X is an inferior good and its price falls, the substitution effect is greater than the income effect so that the consumer buys more of X when its price falls. This fact has been classified by both the methods. But the Hicksian substitution effect RH or AB is greater than the Slutsky substitution effect RS or AC. Similarly, the Hicksian income effect BD is greater than the Slutsky income effect CD.

Conclusion:

The Slutsky theorem is a good approximation to keep real income constant and is superior to Hicks' method. The Slutsky substitution effect provides the consumer greater satisfaction by bringing him on a higher indifference curve, while the Hicksian substitution effect brings him back to the initial level of satisfaction on the original indifference curve.

Hicks himself writes:

“The substitution effect measures the effect of change in relative price, with real income constant, and the income effect measures the effect of the change in real income.”

Hicks' substitution effect is weak because it is based on the compensating variation in income. In the Slutsky method, income can be calculated equal to cost-difference directly by studying market phenomena and behaviour, whereas the compensating variation in income is difficult to estimate.

In the Slutsky method, the income effect and substitution effect can be computed by observing market prices and quantities bought at those prices without any knowledge of indifference curves even. Hicks again admits that the Slutsky “**income effect is peculiarly easy to handle**”, while the compensating variation method makes the analysis complex by joining the income effect with the substitution effect.

Thus, from a practical viewpoint the Slutsky method is superior to the Hicksian method.

Derivation of Individual Demand Curve (With Diagram) | Economics:

A demand curve has been defined as a curve that shows a relationship between the quantity-demanded of a commodity and its price assuming income, the tastes and preferences of the consumer and the prices of all other goods constant. To draw an individual demand curve the information regarding prices of a commodity at different levels and their corresponding quantities demanded is required. The price-consumption curve can provide this information.

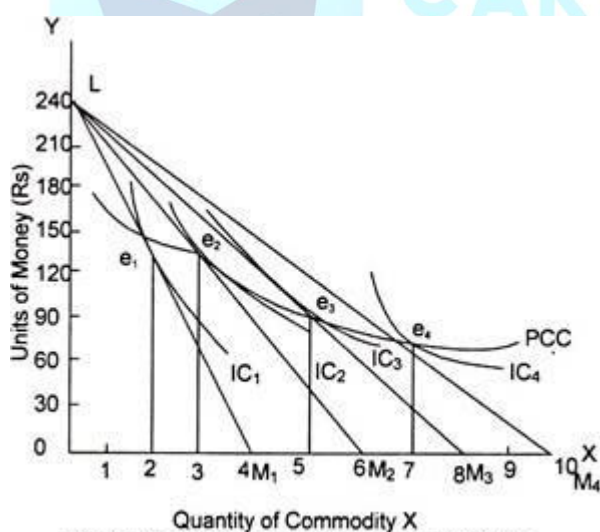


Fig.3.16 Derivation of Individual Demand Curve

Fig. 3.16 illustrates the way in which the individual demand curve can be derived from the price consumption curve. When a demand curve is to be drawn, units of money are measured on the vertical axis while the quantity of a commodity for which demand curve is to be drawn are shown on the horizontal axis.

Suppose a consumer has an income of Rs.240. If the price of the commodity X is Rs.60 per unit, the relevant price line will be LM1, because at this 2 units can be purchased. The consumer is in equilibrium at point e1 where the consumer buys 2 units of the commodity.

Suppose the price of X falls to Rs.40 per unit. The price line shifts to LM2. The consumer attains a new equilibrium point e2 and buys 3 units of X. As the price of X further falls, the budget line shifts to the right and new successive points of equilibrium are attained where the consumer is in equilibrium at e3 and e4 and buys 5 and 7 units of commodity X when the price is Rs.30 and Rs.24 per unit respectively.

With the above information, we draw up the following demand schedule of the consumers.

Individual's Demand Schedule

Price (Rs)	Quantity Demanded
60	2
40	3
30	5
24	7

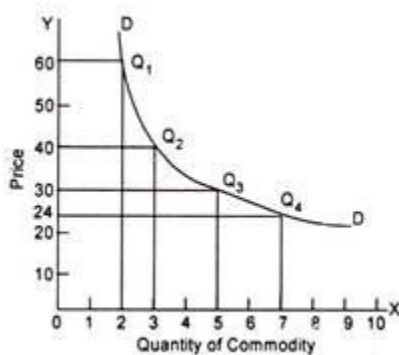


Fig. 3.17. Demand curve

If we plot the data contained in the individual consumer's demand schedule we get points like Q1, Q2, Q3 and Q4. We can easily join these points with a continuous curve. What we get is the usual demand curve of the consumer for the commodity X. We find that the derived demand curve slopes downward from left to right just like usual demand curve.

The demand curve for normal goods will always have a negative slope denoting that the quantity bought increases as the price falls.

UNIT – 3

ONE MARK:

1. **What is a production function?**
 - A production function shows the relationship between inputs and the maximum output that can be produced.
2. **What are the two types of production functions?**
 - Short-run production function and long-run production function.
3. **What is the short run in production?**
 - The short run is a period where at least one factor of production is fixed.
4. **What is the long run in production?**
 - The long run is a period where all factors of production are variable.
5. **State the Law of Variable Proportions.**
 - As more units of a variable input are added to a fixed input, the marginal product first increases, then decreases, and eventually becomes negative.
6. **What are returns to scale?**
 - Returns to scale describe how output changes when all inputs are increased proportionally.
7. **What are the three types of returns to scale?**
 - Increasing returns to scale, constant returns to scale, and decreasing returns to scale.
8. **What is an isoquant?**
 - An isoquant is a curve that represents different combinations of inputs that produce the same level of output.
9. **What is an iso-cost line?**
 - An iso-cost line represents different combinations of inputs that a producer can buy for a given total cost.
10. **What is producer's equilibrium?**
 - Producer's equilibrium is the point where a firm maximizes its output given the cost constraints.
11. **Define cost of production.**
 - Cost of production refers to the total expenses incurred in producing goods and services.
12. **What are the two main types of cost?**
 - Fixed cost and variable cost.
13. **What is a short-run cost curve?**

- It represents costs when at least one input is fixed, including total cost, fixed cost, and variable cost curves.

14. What is a long-run cost curve?

- It represents costs when all inputs are variable, showing economies and diseconomies of scale.

15. Define total revenue (TR).

- Total revenue is the total income earned by a firm from selling goods or services: $TR = P \times Q$.

16. What is average revenue (AR)?

- Average revenue is total revenue per unit of output: $AR = TR/Q$.

17. What is marginal revenue (MR)?

- Marginal revenue is the additional revenue earned from selling one more unit of a good: $MR = \Delta TR / \Delta Q$.

18. How is revenue related to elasticity of demand?

- When demand is elastic, a price decrease increases total revenue, and when demand is inelastic, a price decrease reduces total revenue.

19. What happens to MR when demand is perfectly elastic?

- When demand is perfectly elastic, $MR = AR = \text{Price}$.

20. What is the relationship between AR and MR in a monopoly?

- In a monopoly, MR is always less than AR because the firm must lower the price to sell more.

TWO MARK:

1. What is a production function?

- A production function expresses the technical relationship between input factors (like labor and capital) and the resulting output. It can be represented as $Q = f(L, K)$ where Q is output, L is labor, and K is capital.

2. Differentiate between short-run and long-run production functions.

- In the short run, at least one input is fixed (e.g., capital), while in the long run, all inputs are variable. The short-run focuses on the law of variable proportions, while the long-run explains returns to scale.

3. State and explain the Law of Variable Proportions.

- The law states that as more units of a variable factor (e.g., labor) are added to a fixed factor (e.g., land), output increases at an increasing rate, then at a decreasing rate, and finally may decline.
4. **What are the three stages of the Law of Variable Proportions?**
- (i) Increasing returns: Marginal product (MP) rises.
 - (ii) Diminishing returns: MP declines but remains positive.
 - (iii) Negative returns: MP becomes negative.
5. **What is meant by returns to scale?**
- Returns to scale refer to the change in output when all inputs are increased proportionally. It includes increasing, constant, and decreasing returns to scale.
6. **Explain increasing returns to scale.**
- When inputs increase by a certain percentage and output increases by more than that percentage, it is called increasing returns to scale. It occurs due to specialization and efficiency in production.
7. **What is meant by an isoquant?**
- An isoquant is a curve showing different combinations of inputs that produce the same level of output. It is similar to an indifference curve in consumer theory.
8. **What are the characteristics of an isoquant?**
- Isoquants slope downward, are convex to the origin, and do not intersect each other. They show substitutability between inputs.
9. **Define an iso-cost line.**
- An iso-cost line represents different combinations of two inputs that a firm can afford given its budget. It is similar to a budget line in consumer theory.
10. **What is producer's equilibrium?**
- Producer's equilibrium is the point where the firm maximizes output while minimizing cost. It occurs where the isoquant is tangent to the iso-cost line.
11. **What is the cost of production?**
- The cost of production refers to the total expenses incurred in manufacturing goods or services, including fixed costs and variable costs.
12. **Distinguish between fixed cost and variable cost.**
- Fixed cost remains constant regardless of output (e.g., rent), while variable cost changes with the level of production (e.g., raw materials).
13. **Explain short-run cost curves.**
- Short-run cost curves include total cost (TC), total fixed cost (TFC), total variable cost (TVC), average cost (AC), marginal cost (MC), and they show cost behavior when at least one input is fixed.

14. What are long-run cost curves?

- Long-run cost curves depict cost changes when all inputs are variable. The long-run average cost (LRAC) curve is derived from the short-run cost curves and exhibits economies and diseconomies of scale.

15. Define total revenue (TR).

- Total revenue is the total income a firm earns from selling its output. It is calculated as $TR = P \times Q$, where P is price and Q is quantity sold.

16. Explain the concept of average revenue (AR).

- Average revenue is the revenue per unit of output, calculated as $AR = TR/Q$. Under perfect competition, AR equals price.

17. What is marginal revenue (MR)?

- Marginal revenue is the additional revenue gained from selling one extra unit of a product. It is given by $MR = \Delta TR / \Delta Q$.

18. How is MR related to TR?

- When MR is positive, TR increases; when MR is zero, TR is at its maximum; when MR is negative, TR decreases.

19. What happens to MR in perfect competition?

- In perfect competition, MR equals AR and price because firms can sell any quantity at the market price.

20. What is the relationship between AR and MR in monopoly?

- In a monopoly, MR is always less than AR because a firm must lower the price to sell additional units, reducing additional revenue from extra sales.

21. What is the relationship between elasticity of demand and total revenue?

- If demand is elastic, a price decrease increases TR. If demand is inelastic, a price decrease reduces TR. If demand is unitary elastic, TR remains unchanged.

22. What is the shutdown point of a firm?

- The shutdown point occurs when a firm cannot cover its variable costs in the short run. If price falls below AVC, the firm shuts down operations.

23. What is the breakeven point?

- The breakeven point is where total revenue equals total cost, meaning the firm makes no profit or loss.

24. Explain the concept of economies of scale.

- Economies of scale occur when the average cost of production decreases as output increases. It results from factors like specialization, bulk buying, and efficient machinery.

25. What are diseconomies of scale?

- Diseconomies of scale occur when a firm's per-unit production cost rises as output increases, often due to inefficiencies, communication gaps, and resource limitations.

26. Differentiate between explicit and implicit costs.

- Explicit costs involve direct monetary payments (e.g., wages, rent), whereas implicit costs refer to the opportunity cost of using owned resources (e.g., owner's time).

27. What is the long-run marginal cost (LMC)?

- LMC is the additional cost incurred when producing one extra unit of output in the long run, considering all inputs as variable.

28. What is the significance of marginal cost in decision-making?

- Firms use marginal cost to determine optimal output levels. If $MR > MC$, the firm should increase production; if $MR < MC$, the firm should reduce production.

29. What is the difference between diminishing returns and decreasing returns to scale?

- Diminishing returns apply in the short run when adding more units of a variable factor to a fixed factor lowers marginal productivity. Decreasing returns to scale occur in the long run when increasing all inputs proportionally leads to a less-than-proportional increase in output.

30. Explain the relationship between revenue and elasticity of demand.

- If demand is elastic ($Ed > 1$), a price decrease increases total revenue. If demand is inelastic ($Ed < 1$), a price decrease decreases total revenue. If demand is unitary elastic ($Ed = 1$), total revenue remains unchanged.

BOARD ANSWER:

Law of Variable Proportion:

Law of Variable Proportion is regarded as an important theory in Economics. It is referred to as the law which states that when the quantity of one factor of production is increased, while keeping all other factors constant, it will result in the decline of the marginal product of that factor.

Law of variable proportion is also known as the Law of Proportionality. When the variable factor becomes more, it can lead to negative value of the marginal product.

The law of variable proportion can be understood in the following way.

When variable factor is increased while keeping all other factors constant, the total product will increase initially at an increasing rate, next it will be increasing at a diminishing rate and eventually there will be decline in the rate of production.

Assumptions of Law of Variable Proportion

Law of variable proportion holds good under certain circumstances, which will be discussed in the following lines.

1. Constant state of Technology: It is assumed that the state of technology will be constant and with improvements in the technology, the production will improve.
2. Variable Factor Proportions: This assumes that factors of production are variable. The law is not valid, if factors of production are fixed.
3. Homogeneous factor units: This assumes that all the units produced are identical in quality, quantity and price. In other words, the units are homogeneous in nature.
4. Short Run: This assumes that this law is applicable for those systems that are operating for a short term, where it is not possible to alter all factor inputs.

Stages of Law of Variable Proportion

The Law of Variable proportions has three stages, which are discussed below.

1. First Stage or Stage of Increasing returns: In this stage, the total product increases at an increasing rate. This happens because the efficiency of the fixed factors increases with addition of variable inputs to the product.
2. Second Stage or Stage of Diminishing Returns: In this stage, the total product increases at a diminishing rate until it reaches the maximum point. The marginal and average product are positive but diminishing gradually.
3. Third Stage or Stage of Negative Returns: In this stage, the total product declines and the marginal product becomes negative.

isoquant and Isocost Lines (With Diagram) | Economics:

What is Isoquant and Isocost Line in Production Theory?

A firm's bank objective is profit maximisation. If, in the short run, its total output remains fixed (due to capacity constraint) and if it is a price-taker (i.e., cannot fix the price or change price on its own as in a purely competitive market) its total revenue will also remain fixed. Therefore, the only way to maximise profit is to minimise cost. Thus, profit maximisation and cost minimisation are the two sides of the same coin.

Moreover, supply depends on cost of production. The decision to supply an extra unit depends on the marginal cost of producing that unit. Perhaps the most important determinant of the firm's price-output decision in any market is its cost of production.

The firm's cost, in its turn, depends on two key factors, viz.:

- (1) The technical relation between inputs and output (i.e., how outputs vary as inputs vary), and
- (2) Factor prices (i.e., the price of labour or the wages, the price of capital or the interest rate and so on).

The long-run production function of a firm involving the usage of two factors, say, capital and labour is represented by equal-product curve or isoquant. This curve is also known as a producer's

indifference curve. An isoquant traces out the combinations of any two inputs which yield the same level of output.

These combinations must be the most efficient ones — i.e., any point on an isoquant shows the minimum quantities of the inputs required to produce a given output. Isoquants are typically drawn as being convex to the origin because of the assumed substitutability of inputs.

Isoquants:

An isoquant is a locus of points showing all the technically efficient ways of combining factors of production to produce a fixed level of output. It is also known as the equal product curve. In case of two variable factors, labour and capital, an isoquant appears as a curve on a graph the axes of which measure quantities of the two factors. The curve shows the efficient alternative techniques of production or alternative combinations of two factors that can produce a fixed level of output.

Table 1 : Alternative Methods of Producing Six Units of Output		
Method	Units of K	Units of L
a	18	2
b	12	3
c	9	4
d	6	6
e	4	9
f	3	12
g	2	18

Table 1 illustrates, by using hypothetical numbers, seven alternative methods of producing six units of output. These alternatives are shown also in Fig. 5, as represented by the curve $Q = 6$. Thus, the firm could choose combination a ($18_K + 2_L$), combination g ($2_K + 18_L$) or any other combination shown in Table 1.

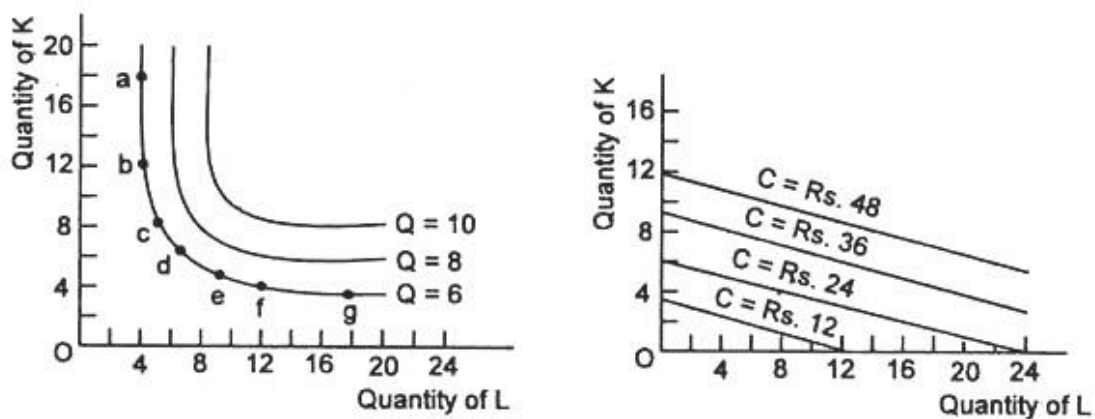


Fig. 5 & 6 : Isoquants and Isocost lines

Fig. 5 shows two other isoquants, each corresponding to particular (fixed) level of output, viz., $Q = 8$ and $Q = 10$. Each curve shows the alternative combinations of labour and capital that would produce 8 and 10 units of output, respectively. We could draw as many isoquants as we like.

Isocost Lines:

An isoquant shows what a firm is desirous of producing. But, the desire to produce a commodity is not enough. The producer must have sufficient capacity to buy necessary factor inputs to be able to reach its desired production level. The capacity of the producer is shown by his monetary resources, i.e., his cost outlay (or how much money he is capable of spending) on capital and labour, the prices of which are taken as constant, i.e., given in the market place.

So, like the consumer the producer has also to operate under a budget (resource) constraint. This is picturised by his budget line called isocost line. To find the least cost combination of inputs to produce a given output, we need to construct such equal cost lines or isocost lines.

An isocost line is a locus of points showing the alternative combinations of factors that can be purchased with a fixed amount of money. In fact, every point on a given isocost line represents the same total cost. To construct isocost lines we need information about the market prices of the two factors. For example, suppose, the price of labour is Re. 1 per unit and the price of capital is Rs. 4 per unit.

Then an outlay of Rs. 36 could buy $9K + 0L$, $36L + 0K$, or other combinations such as $5K + 16L$. All these and other various combinations are shown in Fig. 2 by isocost line $C = \text{Rs. } 36$. Isocost lines $C = \text{Rs. } 12$, $C = \text{Rs. } 24$ and $C = \text{Rs. } 48$ show the alternative combinations of capital and labour that can be purchased or hired by spending Rs. 12, Rs. 24 and Rs. 48, respectively.

These lines are straight lines because factor prices are constant and they have a negative slope equal to the factor-price ratio, i.e., the ratio of labour price to capital price (i.e., the wage ratio - the rate of interest).

Cost Minimisation:

Here, the firm seeks to minimise its cost of producing a given level of output. To find the least-cost combination of factors for fixed level of output we combine Fig. 5 and Fig. 6 in Fig. 7. Suppose, the producer wants to produce six units of output. He could do so using the combination represented by points A, B or C in Fig. 3.

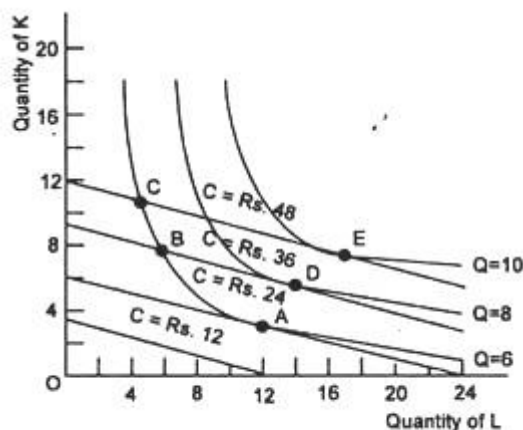


Fig. 7 : Cost minimisation

For example, the cost would be Rs. 48 at C, Rs. 36 at B and Rs. 24 at A. The cheapest method is at A, where the isoquant for output of six ($Q = 6$) is tangent to an isocost line ($C = \text{Rs. } 24$). In Fig. 3 the firm tries to find out the least expensive factor combination along its isoquant. It looks for that factor combination that is on the lowest of the isocost lines. Where the isoquant touches (but does not cross) the lowest isocost line is the least cost position.

The tangency points shows that optimisation in production is reached when factor prices and marginal product are proportional, with equalised marginal product per rupee. The minimum-cost points are A, D and E. Each such point shows the equilibrium factor combination for maximising output subject to cost constraint, i.e., subject to fixed factor prices and fixed outlay (on resources).

We may now speak a few words about the slopes of isoquant and an isocost line. The slope of an isoquant gives the marginal rate of technical substitution (MRTS) defined as the increase in the quantity of one factor that is required to replace a unit decrease in another factor, when output is held constant along any isoquant. It is also known as the desired rate of factor substitution, i.e., the rate at which the producer wants to substitute one factor by the other.

MRTS is, in fact, the ratio of the marginal products of the factors. To see this, consider an example. Assume that output is such that the MP_L and the MP_K are both equal to 2 (units of output), i.e., $MP_K = MP_L$. If the firm is to maintain the same level of output while reducing capital by one unit, it needs to replace one unit of capital by one unit of labour. If at another point on the same isoquant, the $MP_L = 2$, while the $MP_K = 1$, the firm needs to replace a unit of capital with only half unit of labour.

An isocost line shows the alternative quantities of two factors viz., capital and labour that can be purchased or hired with a fixed sum of money. Its slope is given by the ratio of the prices of the two factors. It is known as the actual rate of factor substitution, the rate at which the firm can substitute labour by capital in the market place.

Thus, in Fig. 3, given the prices of labour and capital at Re 1 and Rs. 4 per unit, respectively, the slope of $C = Rs. 12$ is determined by drawing the line joining points $3K + 0L$ (which represents outlay of Rs. 12 entirely on capital) and $12L + 0K$ (Rs. 12 spent entirely on labour). All the isocost lines in the diagram have the same slope because the relative prices of labour and capital are the same. If labour were relatively more expensive, the isocost lines would be steeper in Fig. 2.

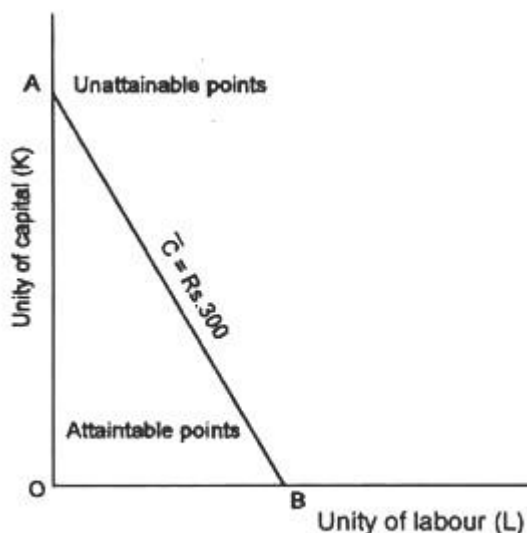


Fig. 2 : An isocost line

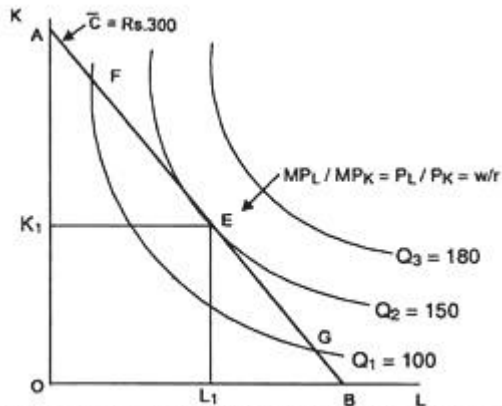


Fig. 3 : Production of maximum output with a fixed outlay

Conclusion:

Cost minimisation occurs when an isoquant is just tangent to (but does not cross) an isocost line. When this happens the ratio of the prices of factors is the same as the ratio of their marginal products. Symbolically

$$MP_L / MP_K = P_L / P_K$$

AR, MR and Elasticity of Demand (With Diagram):

Relationship between AR, MR and Elasticity of Demand!

The relationship between AR, MR and elasticity of demand is very useful at any level of output.

This relationship is very useful in the price-determination under different market conditions. It has been discussed that average revenue curve of a firm is the same thing as the demand curve of the consumer for the product of the firm.

It means AR curve is from the point of view of seller but the same is the demand curve from the consumer's point of view. It means elasticity of demand at any point on the demand curve is the same thing as the elasticity on the demand curve. Before we discuss the mutual relationship between AR, MR and Elasticity of demand, let us study these concepts briefly. AR is the revenue per unit of output sold. AR is the ratio of TR to total output. Besides, AR is nothing but the price.

It can be seen as:

$$AR = \frac{TR}{q}, TR = Pq$$

$$AR = \frac{Pq}{q} = P$$

MR is the difference made to TR by selling one more unit of the commodity. It means

$$MR = TR_n - TR_{n-1}$$

Also

$$MR = TR_{n+1} - TR_n$$

$$MR = \frac{\Delta TR}{\Delta q}$$

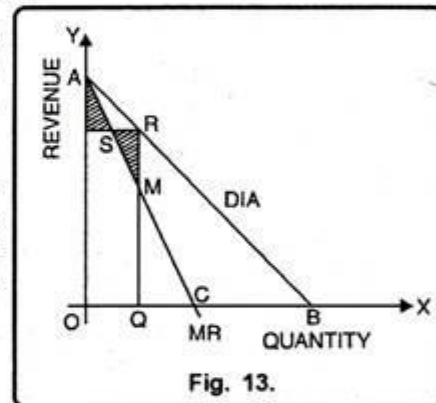
(We have already studied these concepts in details)

Elasticity of demand is the rate at which quantity demanded changes as the price changes. In case of point elasticity of demand, the formula is

$$E_d \text{ at a point on the demand curve} = \frac{\text{Lower segment}}{\text{Upper segment}}$$

With the help of point method, we can study the relationship between AR, MR and elasticity of demand at any level of output. We can study this relationship with the help of a diagram.

In the diagram, we find D/AR, and MR are demand/Average Revenue, and Marginal Revenue Curves respectively. We want to measure elasticity of demand at point R. According to point elasticity of demand.



$$E_d = \frac{\text{Lower segment}}{\text{Upper segment}} \text{ or } E_d = \frac{RB}{RA} \quad \dots(i)$$

(Let us recollect Point Method of Elasticity of Demand)

2 Δ s APR and RQB

$$\angle P = \angle Q \text{ (rt. } \angle \text{ s)}$$

$$\angle dR = \angle B \text{ (cor. } \angle \text{ s)}$$

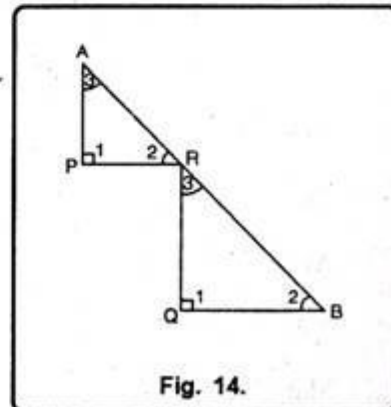
$$\angle A = \angle R \text{ (being 3rd } \angle \text{)}$$

$\therefore \Delta$ s APR and RQB are equiangular, so their sides are proportionate. Hence

$$\frac{RB}{RA} = \frac{RQ}{AP} \quad \dots(ii)$$

Now Δ s, APS and MRS are congruent because

$$\angle S = \angle S \quad (\angle \text{ vert. opp. } \angle \text{ s})$$



$$\begin{aligned}\angle P &= \angle R && (\text{rt. } \angle s) \\ \angle A &= \angle M && (\text{being 3rd } \angle)\end{aligned}$$

Δs APS and MRS are also equal in area,

$\therefore \Delta s$ are congruent i.e. equal in all respects

Hence $AP = RM$

From (ii) and (iii), we get

$$Ed \text{ at } R = \frac{RB}{RA} = \frac{RQ}{AP} = \frac{RQ}{RM}$$

To elaborate it

$$Ed \text{ at } R = \frac{RQ}{RM} = \frac{RQ}{RQ - MQ}$$

Now it is clear that,

RQ = the average revenue

MQ = the marginal revenue

E = Elasticity of demand on the AR curve

In this case,

$$E = \frac{A}{A - M}$$

A stands for Average Revenue

M stands for Marginal Revenue

E stands for Elasticity of Demand

Now it follows

$$E(A - M) = A$$

$$EQ - EM = A$$

$$EQ - A = EM$$

$$A(E - 1) = EM$$

$$A = M \left(\frac{E}{E - 1} \right)$$

Also

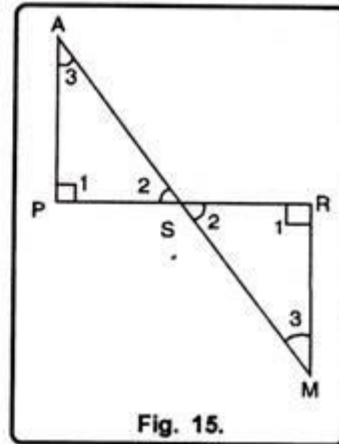
$$M = A \left(\frac{E - 1}{E} \right)$$

Thus it is clear that at any output

$$\text{Average Revenue} = \text{Marginal Revenue} \times \frac{E}{E - 1}$$

Similarly

$$\text{Marginal Revenue} = \text{Average Revenue} \times \frac{E - 1}{E}$$



Alternative Algebraic Formula:

Let us suppose that original price is 'P' and original quantity is 'q'.

Now $TR_1 = P \times q$ or Pq ... (i)

Now price of the commodity falls ($P - \Delta P$) where as the quantity increases ($q + \Delta q$).

In this case,

$$TR_2 = (P - \Delta P) \times (q + \Delta q)$$

$$TR_2 = Pq + P \Delta q - q \Delta P - \Delta q \Delta P$$
 ... (ii)

Now deduct TR_1 from TR_2 , we get

$$TR_2 - TR_1 = Pq + P \Delta q - q \Delta P - \Delta q \Delta P - Pq$$

$$\Delta TR = P \Delta q - q \Delta P$$
 ... (iii)

($\Delta q \Delta P$ cancelled, it being negligible change)

We know, by definition MR is the ratio of ΔTR to Δq .

So we divide eq. (iii) by Δq .

$$\Delta q = \frac{P \Delta q}{\Delta q} - q \cdot \frac{\Delta P}{\Delta q} \left(\frac{\Delta TR}{\Delta q} = M \text{ or Marginal Revenue} \right)$$

$$M = P - q \cdot \frac{\Delta P}{\Delta q}$$

Take P, as common, we get

$$M = P \left(1 - \frac{q}{P} \cdot \frac{\Delta P}{\Delta q} \right)$$

(P is nothing but Average revenue, so we denote it as A).

$$M = A \left(1 - \frac{q}{P} \cdot \frac{\Delta P}{\Delta q} \right)$$
 ... (iv)

We know, according to Proportionate method of elasticity.

$$E = \frac{\Delta q}{\Delta P} \times \frac{P}{q}$$

In eqn. (iv), we find inverse of E i.e. $\left(\frac{1}{E} \right)$

Let us put it in eq. (iv)

$$M = A \left(1 - \frac{1}{E} \right)$$

or

$$M = A \left(\frac{E - 1}{E} \right)$$
 ... (i)

Similarly,

$$A = M \left(\frac{E}{E - 1} \right)$$
 ... (ii)

Now in terms of A and M is E

$$A(E - 1) = ME$$

$$(i) \quad AE - A = ME$$

$$(ii) \quad AE - ME = A$$

$$E(A - M) = A$$

$$(iii) \quad E = \frac{A}{A - M}$$

Now with these formulae, we can calculate MR at any level of output if AR elasticity of demand at the same output level is given :

(i) If $E = 1$, in that case $MR = 0$.

$$M = A \left(\frac{E-1}{E} \right) = A \left(\frac{1-1}{1} \right)$$

$$M = (0) = 0$$

(ii) In $E = 2$, in that case $MR = \frac{1}{2}(AR)$

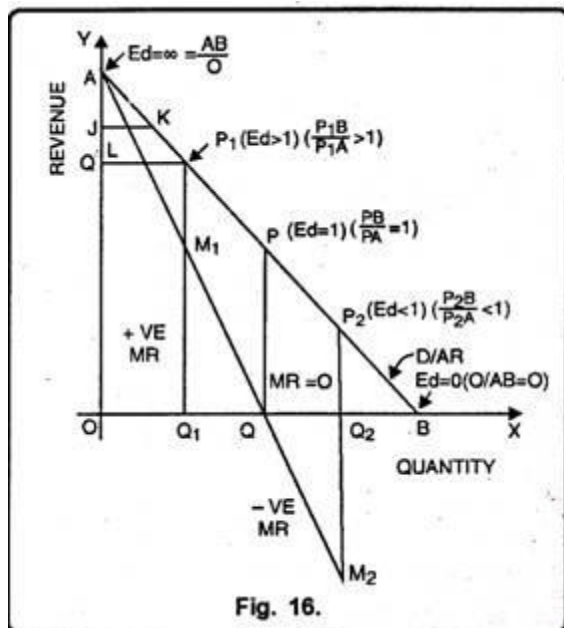
$$M = A \left(\frac{e-1}{e} \right) = A \left(\frac{2-1}{2} \right) = \frac{1}{2}(A)$$

(iii) If $E = \frac{1}{2}$ in that case MR is Negative.

$$M = A \left(\frac{e-1}{e} \right) = A \left(\frac{\frac{1}{2}-1}{\frac{1}{2}} \right) = A \left(\frac{-\frac{1}{2}}{\frac{1}{2}} \right)$$

Thus, it is clear that at different levels of output where elasticity of demand is greater than one, the marginal revenue will be positive. On the other hand, if the elasticity of demand is equal to one, in that case the $MR = 0$. Lastly, if elasticity of demand is less than one, in that case MR will be negative.

This can be made further clear with the help of a diagram given below:



If elasticity of demand is equal to one or $E = 1$, in that case $MR = 0$. OQ quantity is demanded at EQ price. At this $E = 1$ because P is in the centre of AB demand curve. In this case, you see MR curve touches the X -axis at point Q . It shows; $MR = 0$.

If $E > 1$, in that case MR will be positive. OQ_1 quantity is demanded at P_1Q_1 price. At P_1 elasticity of demand is greater than one i.e. $E > 1$. The MR for OQ_1 output is M_2Q_2 which is positive.

At OQ_2 output $AR = P_2Q_2$ elasticity of demand at is less than one, so MR is M_2Q_2 which is negative.

Long Run Average Cost Curves:

After discussion the short-run cost behaviour we may pass on to long-run cost behaviour. The short-run is the time period during which production cannot be fully adjusted to meet a change in demand because some of the factors cannot be varied. On the other hand, the long-run is the period during which all types of adjustments can be made to meet the changed demand because all the factors can be varied.

Thus, if the demand for bus transport in a particular town increases greatly in the short run there should be greater use of the existing buses. But in the long run additional buses can be ordered. The long-run is the period when full adjustment can be made.

The same thing is true of a firm. In the short run extra output can be produced by a firm by utilising its existing capacity (i.e., plant and machinery) more intensively. In the long run, capacity can be varied, new machines can be ordered, the size of the factory can be altered, or new factories can be set up.

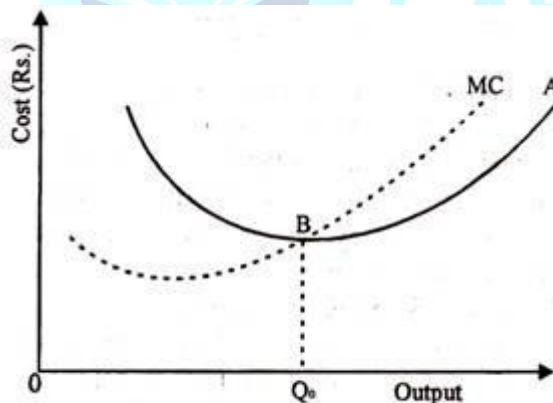


Fig. 7.4. Relationship between MC and AC

In the short run full adjustment to a change in demand is hindered by the fact that some of the factors are fixed in supply for the time being. On the other hand, a long run curve shows the cost per unit for different levels of output when all factors can be varied.

The U-shaped curve:

For a particular level of equipment and scale the average cost of a firm is represented by a U-shaped curve. Suppose U_1 , U_2 , and U_3 in Fig. 7.5, are three different short run average cost curves for three different scales of production. For each of these scales there is an optimum output. The producer would ordinarily like to produce the optimum output because his average cost is least at this point. But if demand changes it may be necessary to increase or decrease his output and he may consider it desirable to alter his scale of production.

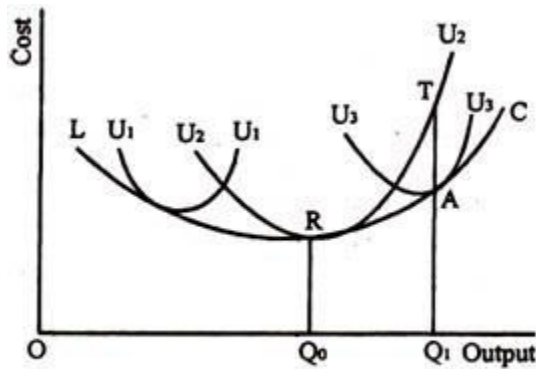


Fig. 7.5. Relation between short-run and long-run average cost curves

Suppose at a particular time, a producer is under cost curve U_2 and produces OQ_0 . He finds it necessary to produce OQ_1 . If he continues under the old scale his average cost will be Q_1T . Suppose he alters his scale so that his new cost curve is U_3 . The average cost of producing OQ_1 is now Q_1A . Q_1A is less than Q_1T . So the new scale is preferable to the old and will be adopted. In the long run the average cost has changed from Q_0R to Q_1A .

Relationship:

Relationship between the long-run cost curve and the short-run cost curves:

The long-run cost curve is a curve which shows how costs change when the scale of production is changed. This curve is obtained by drawing a line which touches the series of possible short-run cost curves. In Fig. 7.5 LRAC is such a line. Mathematically speaking LRAC is the envelope of U_1, U_2, U_3 , etc.

The long-run cost curve is the locus of equilibrium point on the short-run cost curves. At the equilibrium points, a movement along the short-run cost curve and a movement along the long-run cost curve must involve the same change of cost. That is, the short-run and the long-run marginal costs must be equal. This condition is satisfied only if the long-run average cost curve is tangential to the short-run average cost curves.

Shape:

Shape of the Long Run Average Cost Curve. The general opinion is that the long-run average cost curve is U-shaped, like the short-run average cost curve, but is flatter.

This means three things:

- (i) The long run cost curve initially slopes downwards, i.e., average costs fall.
- (ii) Later on, it slopes upwards, i.e., average costs increase.
- (iii) The rate of increase or decrease of costs is less than what they are in the short-run.

Proof:

These propositions can be proved as follows:

Initially the average cost decreases because certain economies of scale are available (the economies of large-scale production; economical use of the indivisible factors of production, etc.). With expansion of scale a stage comes when no further economies are available or the economies are

more than counterbalanced by, diseconomies (like managerial difficulties, higher transport costs, etc.).

When this stage comes the average cost begins to rise. In either case the rate of decrease or increase of costs is slower than the rates in the short run because fixed costs play a more important part in the short run. In the long run the fixed equipment can be altered. The equipment can be adjusted to the output. In the short run such adjustment is not possible and, therefore, costs vary considerably with variation of output.

Total Cost (TC):

The total cost of production has two components the fixed cost, FC, which is borne by the firm, whatever level of output it produces, and the variable cost, VC, which varies with the level of output. Fixed costs may include expenditures for plant maintenance, insurance, a minimal number of employees, etc. — these costs remain unchanged no matter how much the firm produces.

Average Cost (AC):

Average cost is the cost per unit of output. There are three types of average cost average fixed cost, average variable cost and average total cost. Average fixed cost (AFC) is the total fixed cost (column 1) divided by the level of output, TFC/Q . Because fixed cost is constant, average fixed cost declines as the rate of output increases.

Marginal Cost (MC):

MC, also called incremental cost, is the increase in cost that results from producing one extra unit of output. Since FC does not change as the firm's level of output changes, MC is just the increase in variable cost that results from an extra unit of output.

We can thus write MC as $MC = \Delta VC / \Delta Q$. MC tells us how much it will cost to expand the firm's output by one unit. In Table 7.1, MC is calculated from either the VC (column 2) or the total cost (column 3).

Average Variable Cost (AVC):

AVC is the total variable cost divided by the level of output, TVC/Q . Finally, average total cost (ATC) is the total cost divided by the level of output, TC/Q . The average total cost tells us the per-unit cost of production. By comparing the ATC to the price of the product, we can determine whether production is profitable.

UNIT – 4

ONE MARK:

1. **What is Macroeconomics?**

- Macroeconomics is the branch of economics that studies large-scale economic factors such as national income, inflation, and unemployment.

2. **Who is known as the father of Macroeconomics?**

- John Maynard Keynes is considered the father of Macroeconomics.

3. **What is the scope of Macroeconomics?**

- It includes national income, employment, inflation, economic growth, and monetary & fiscal policies.

4. **Name two important macroeconomic variables.**

- National income and inflation.

5. **What is the importance of Macroeconomics?**

- It helps in economic policy formulation, controlling inflation, unemployment, and fostering economic growth.

6. **What is the main limitation of Macroeconomics?**

- It assumes that the economy functions as a whole and ignores individual differences.

7. **What is a stock variable?**

- A stock variable is measured at a specific point in time, like wealth or capital.

8. **What is a flow variable?**

- A flow variable is measured over a period of time, like income or investment.

9. **Give an example of a stock variable.**

- Foreign exchange reserves of a country.

10. **Give an example of a flow variable.**

- National income per year.

11. **What is macro statics?**

- It studies economic variables at a specific point in time without analyzing changes over time.

12. **What is macro dynamics?**

- It studies how economic variables change over time and their long-term impact.

13. **What is a two-sector economy?**

- An economy consisting of only households and firms.

14. **What is a three-sector economy?**

- An economy that includes households, firms, and the government.

15. What is a four-sector economy?

- An economy that includes households, firms, government, and the foreign sector (international trade).

16. What is national income?

- The total income earned by a nation's residents in a given period.

17. What is the difference between micro and macroeconomics?

- Microeconomics studies individual markets, while macroeconomics studies the whole economy.

18. What is the role of government in a three-sector economy?

- The government collects taxes, provides public goods, and regulates economic activities.

19. What does the foreign sector in a four-sector economy include?

- Imports, exports, and foreign exchange transactions.

20. What is the difference between macro statics and macro dynamics?

- Macro statics studies the economy at a fixed point, while macro dynamics examines changes over time.

TWO MARK:

1. What is Macroeconomics?

Macroeconomics is the branch of economics that studies the economy as a whole. It focuses on aggregate economic indicators like national income, GDP, inflation, unemployment, and overall economic growth. It helps policymakers understand economic fluctuations and make informed decisions regarding fiscal and monetary policies.

2. How does Macroeconomics differ from Microeconomics?

While microeconomics studies individual economic units like households and firms, macroeconomics examines large-scale economic phenomena. Macroeconomics focuses on overall income levels, inflation, and employment, whereas microeconomics analyzes individual markets, prices, and consumer behavior.

3. What is the scope of Macroeconomics?

Macroeconomics covers key areas such as national income, aggregate demand and supply, employment, inflation, monetary and fiscal policies, economic growth, and international trade. It aims to understand and regulate economic fluctuations for long-term stability.

4. Why is Macroeconomics important?

Macroeconomics helps governments in formulating policies for economic stability, growth, and development. It addresses issues like unemployment, inflation, and economic crises, enabling policymakers to take corrective measures through monetary and fiscal tools.

5. What are the limitations of Macroeconomics?

Macroeconomics assumes that the economy operates as a single unit, ignoring individual differences. It relies on theoretical assumptions that may not always hold true in real-world scenarios. Additionally, macroeconomic policies may have delayed effects.

6. What are Macroeconomic Variables?

Macroeconomic variables are indicators used to measure economic performance. Examples include GDP, inflation, unemployment rate, national income, government spending, and money supply. These variables help analyze and predict economic trends.

7. What is the difference between Stock and Flow Variables?

Stock variables measure economic quantities at a specific point in time (e.g., wealth, money supply), whereas flow variables measure changes over a period of time (e.g., income, investment, government expenditure).

8. What is National Income?

National Income refers to the total earnings generated by a country's residents from productive activities within a specific time period. It includes wages, rent, interest, and profits, reflecting the overall economic health of a nation.

9. What is the significance of National Income?

National income helps assess economic performance, compare living standards across countries, formulate policies, and track economic development. It serves as a crucial indicator for economic planning.

10. What is Macro Statics?

Macro statics studies the economy at a particular point in time, assuming all economic variables remain constant. It provides a snapshot of an economy's performance but does not analyze changes over time.

11. What is Macro Dynamics?

Macro dynamics examines economic changes over time, analyzing fluctuations in national income, employment, inflation, and growth. It helps in understanding long-term economic trends and policymaking.

12. Explain the concept of a Two-Sector Economy.

A two-sector economy consists of only households and firms. Households provide factors of production, and firms use them to produce goods and services. There is no government intervention or foreign trade.

13. What is a Three-Sector Economy?

A three-sector economy includes households, firms, and the government. The government collects taxes, provides public services, and regulates economic activities through fiscal and monetary policies.

14. What is a Four-Sector Economy?

A four-sector economy consists of households, firms, the government, and the foreign sector. It includes international trade, considering exports, imports, and foreign capital flows.

15. What is the role of the government in a Three-Sector Economy?

The government regulates economic activities, provides public goods and services, levies taxes, and implements policies to ensure economic stability and growth.

16. What is GDP (Gross Domestic Product)?

GDP is the total monetary value of all goods and services produced within a country's borders in a given period. It serves as a measure of economic growth and national productivity.

17. What is the difference between Nominal GDP and Real GDP?

Nominal GDP is measured at current market prices without adjusting for inflation, while Real GDP accounts for inflation, providing a more accurate measure of economic growth.

18. What are the components of GDP?

GDP consists of four main components: consumption (C), investment (I), government spending (G), and net exports (exports - imports). These components determine a nation's economic activity.

19. What is Inflation?

Inflation is the rate at which the general price level of goods and services rises, reducing the purchasing power of money. It is measured using indices like the Consumer Price Index (CPI).

20. What are the causes of Inflation?

Inflation can result from demand-pull factors (excess demand), cost-push factors (rising production costs), and excessive money supply due to expansionary monetary policies.

21. What is Unemployment?

Unemployment refers to a situation where individuals willing and able to work at prevailing wage rates are unable to find jobs. It indicates economic inefficiency and underutilization of resources.

22. What are the different types of Unemployment?

Unemployment can be classified as structural (skills mismatch), cyclical (economic downturns), frictional (temporary job transitions), and seasonal (weather-dependent industries).

23. What is Aggregate Demand?

Aggregate Demand is the total demand for all goods and services in an economy at a given price level. It includes consumption, investment, government spending, and net exports.

24. What is Aggregate Supply?

Aggregate Supply refers to the total quantity of goods and services that producers are willing to supply at different price levels. It is influenced by factors like production costs and technological advancements.

25. What is Money Supply?

Money Supply is the total amount of money available in an economy, including currency in circulation and bank deposits. It influences inflation, interest rates, and economic stability.

26. What is Fiscal Policy?

Fiscal policy refers to government actions related to taxation and public expenditure to influence economic growth, control inflation, and stabilize the economy.

27. What is Monetary Policy?

Monetary policy involves the regulation of money supply and interest rates by the central bank to control inflation, maintain financial stability, and promote economic growth.

28. What is the Balance of Payments (BOP)?

The Balance of Payments is a record of all economic transactions between residents of a country and the rest of the world, including trade, investments, and capital flows.

29. What is the importance of the Balance of Payments?

The Balance of Payments helps in assessing a country's economic stability, foreign exchange reserves, trade surplus or deficit, and overall economic health.

30. What is Economic Growth?

Economic growth refers to the increase in a country's GDP over time. It signifies an improvement in living standards, higher employment rates, and greater production efficiency.

BOARD ANSWER:

1. Define Macroeconomics. Explain its nature and scope.

Introduction:

Macroeconomics is the branch of economics that deals with the study of large-scale economic factors, including national income, total employment, inflation, and overall economic growth. Unlike microeconomics, which focuses on individual markets and consumers, macroeconomics examines the economy as a whole and provides insights into government policies and economic stability.

Nature of Macroeconomics:

1. **Aggregative Approach:** Macroeconomics studies the overall functioning of an economy by analyzing aggregates such as GDP, inflation rate, and employment levels.
2. **General Equilibrium Analysis:** It examines how different sectors of the economy—households, firms, government, and the foreign sector—interact and maintain equilibrium.
3. **Policy-Oriented:** Macroeconomics helps governments formulate fiscal and monetary policies to control inflation, unemployment, and economic growth.
4. **Dynamic in Nature:** It studies economic changes over time, such as business cycles, growth trends, and development patterns.
5. **Interdisciplinary:** Macroeconomics is linked to fields like public finance, development economics, and international trade.

Scope of Macroeconomics:

1. **National Income and Output:** Macroeconomics studies the measurement of national income through concepts like GDP, GNP, and NNP.
2. **Employment and Unemployment:** It analyzes employment trends and causes of unemployment in an economy.
3. **Inflation and Price Stability:** Macroeconomics studies inflationary trends and deflation, suggesting policies to control price fluctuations.
4. **Economic Growth and Development:** It examines factors influencing long-term economic growth and development strategies.
5. **Monetary and Fiscal Policies:** It explores how government policies impact economic stability and growth.
6. **International Trade and Balance of Payments:** Macroeconomics analyzes imports, exports, foreign exchange rates, and their impact on a country's economy.

Conclusion:

Macroeconomics plays a crucial role in guiding policymakers, businesses, and individuals by analyzing economic trends and providing solutions for economic stability and development.

2. Explain the concept of macroeconomic variables with examples.**Introduction:**

Macroeconomic variables are indicators that help analyze the overall economic performance of a country. They influence economic policies, business decisions, and government strategies.

Types of Macroeconomic Variables:

1. **Gross Domestic Product (GDP):** GDP represents the total value of goods and services produced within a country during a specific period. It is a key measure of economic performance.
2. **National Income:** It includes the total earnings of a country's residents, including wages, profits, and rents.
3. **Inflation Rate:** Inflation measures the rise in the general price level of goods and services over time. It reduces the purchasing power of money.
4. **Unemployment Rate:** This represents the percentage of people who are willing and able to work but cannot find employment. High unemployment indicates economic instability.
5. **Money Supply:** It refers to the total amount of money circulating in an economy, including cash and bank deposits. A high money supply can lead to inflation.
6. **Interest Rates:** The cost of borrowing money affects investment, consumer spending, and economic growth. Lower interest rates stimulate economic activity, while higher rates control inflation.
7. **Exchange Rates:** The value of a country's currency in relation to foreign currencies impacts trade and investment. A weaker currency can boost exports, while a stronger currency makes imports cheaper.

Conclusion:

Macroeconomic variables help economists and policymakers assess economic health and implement measures to maintain stability and growth.

3. Distinguish between stock and flow concepts in macroeconomics with examples.**Introduction:**

In macroeconomics, economic variables are classified into stock and flow concepts based on their measurement over time. Understanding these concepts helps in analyzing economic trends and policies.

Stock Concept:

A stock variable represents a quantity measured at a specific point in time. It does not change unless affected by external factors. Examples include:

- **Wealth:** The total assets owned by an individual or a nation at a given time.
- **Money Supply:** The total amount of money in circulation at a particular date.
- **Foreign Exchange Reserves:** The total reserves of foreign currency held by a country's central bank.

Flow Concept:

A flow variable measures economic activity over a period of time. It reflects changes in stock variables. Examples include:

- **Income:** Monthly or annual earnings of an individual.
- **Investment:** The amount of money spent on capital goods within a specific time.
- **Exports and Imports:** The value of goods and services traded internationally within a financial year.

Key Differences Between Stock and Flow:

Aspect	Stock Variable	Flow Variable
Definition	Measured at a specific point in time	Measured over a period of time
Examples	Wealth, Money Supply, Reserves	Income, Investment, GDP
Nature	Static in nature	Dynamic in nature
Conclusion:	Both stock and flow concepts are essential in macroeconomic analysis, helping economists understand how economic factors evolve over time.	

4. Explain the different types of economic systems with their features.**Introduction:**

An economic system is the framework within which a country organizes its economic activities, including production, distribution, and consumption of goods and services. There are three main types of economic systems:

1. Capitalist Economy (Market Economy):

- In a capitalist economy, private individuals and businesses own and control resources.
- Prices are determined by market forces of demand and supply.
- The government has minimal intervention in economic activities.
- Examples: The United States, Canada, and Germany follow a capitalist economy.

2. Socialist Economy (Command Economy):

- The government owns and controls all means of production.
- Economic decisions regarding production and pricing are centrally planned.
- The focus is on equal distribution of wealth and welfare of citizens.

- Examples: China, North Korea, and Cuba have socialist economies.

3. Mixed Economy:

- A mixed economy combines features of both capitalism and socialism.
- Both private and public sectors coexist, with government intervention in essential sectors like healthcare and education.
- The government regulates industries to prevent monopolies and economic disparities.
- Examples: India, France, and the UK have mixed economies.

Conclusion:

Each economic system has its advantages and disadvantages. A mixed economy is widely preferred as it balances economic freedom with social welfare.

5. What is the difference between Macro Statics and Macro Dynamics?

Introduction:

Macroeconomics studies economic phenomena in both static and dynamic contexts. Macro statics and macro dynamics are two approaches used to analyze economic conditions.

Macro Statics:

- It examines the economy at a particular point in time.
- It assumes that all economic factors remain constant.
- Examples include the study of national income in a single year and market equilibrium at a fixed price.

Macro Dynamics:

- It studies economic changes over time.
- It analyzes trends like inflation, employment, and economic growth.
- Examples include the study of business cycles and long-term economic development.

Aspect	Macro Statics	Macro Dynamics
Focus	Economic conditions at a given time	Changes in economic conditions over time
Examples	Market equilibrium, GDP in a single year	Business cycles, long-term growth
Nature	Static, assumes no change	Dynamic, considers changes over time

Conclusion:

Both approaches help in understanding economic stability and growth, guiding policymakers in designing long-term strategies for economic development.

6. Explain the concept of a Two-Sector, Three-Sector, and Four-Sector Economy.

Introduction:

An economy consists of various sectors that interact to determine national income and output.

Based on the number of sectors involved, an economy can be classified into a two-sector, three-sector, or four-sector economy.

Two-Sector Economy:

- It consists of only two sectors: **households and firms**.
- Households provide factors of production (land, labor, capital, and entrepreneurship) to firms in exchange for income (wages, rent, interest, and profit).
- Firms produce goods and services and sell them to households, creating a continuous flow of income and expenditure.
- There is no government intervention, taxation, or international trade in this model.

Three-Sector Economy:

- It includes the **government sector** along with households and firms.
- The government collects **taxes** from households and firms and provides **public goods and services** (such as roads, defense, and education).
- The government also influences economic activities through **fiscal policies** (taxation and government spending).

Four-Sector Economy:

- It includes the **foreign sector** in addition to households, firms, and government.
- The foreign sector accounts for **exports and imports**, affecting the balance of payments.
- **Net exports (Exports - Imports)** influence national income.
- This model is the most realistic as it represents an open economy that engages in global trade.

Conclusion:

The complexity of an economy increases with the addition of new sectors. While a two-sector economy is the simplest, a four-sector economy provides a comprehensive understanding of real-world economic interactions.

7. Discuss the Importance and Limitations of Macroeconomics.

Introduction:

Macroeconomics plays a vital role in analyzing economic trends, guiding government policies, and ensuring economic stability. However, it also has certain limitations.

Importance of Macroeconomics:

1. **Helps in National Income Estimation:** It provides insights into GDP, GNP, and per capita income, which are key indicators of economic health.
2. **Guides Government Policies:** Macroeconomics assists in designing fiscal and monetary policies to control inflation, unemployment, and economic growth.

3. **Studies Economic Fluctuations:** It helps in understanding business cycles, economic recessions, and booms.
4. **Ensures Price Stability:** Macroeconomics helps governments control inflation and maintain a stable price level.
5. **Facilitates International Trade Analysis:** It examines the impact of trade policies, exchange rates, and foreign investments on the economy.

Limitations of Macroeconomics:

1. **Aggregation Issues:** Macroeconomics deals with large aggregates like total income, total employment, and total investment, which may not reflect the condition of specific industries or groups.
2. **Assumption-Based Models:** Many macroeconomic theories rely on unrealistic assumptions such as perfect competition and rational behavior.
3. **Difficulty in Precise Forecasting:** Predicting economic trends accurately is challenging due to external shocks and changing global conditions.
4. **Neglect of Microeconomic Factors:** Macroeconomics does not analyze individual consumer behavior or market-specific factors.
5. **Government Policy Limitations:** While macroeconomic policies aim to control economic instability, their effectiveness depends on implementation and external influences.

Conclusion:

Despite its limitations, macroeconomics is essential for economic planning, policy-making, and maintaining stability in national and global economies.

8. Explain the Concept of National Income and Its Measurement Methods.

Introduction:

National income refers to the total monetary value of goods and services produced within a country over a given period. It reflects the economic performance of a nation.

Methods of Measuring National Income:

1. **Production Method (Value-Added Method):**
 - Measures the total value of goods and services produced in an economy.
 - **Formula:** National Income = Gross Value of Output - Value of Intermediate Goods.
 - Useful for estimating sector-wise contributions like agriculture, industry, and services.
2. **Income Method:**
 - Measures national income by adding up all incomes earned by individuals and businesses, including wages, rents, interest, and profits.
 - **Formula:** National Income = Wages + Rent + Interest + Profit.

- Suitable for assessing income distribution in an economy.

3. Expenditure Method:

- Measures national income based on total spending by households, businesses, government, and foreign entities.
- **Formula:** $\text{National Income} = \text{Consumption} + \text{Investment} + \text{Government Expenditure} + \text{Net Exports}$.
- Useful for understanding spending patterns and demand in an economy.

Challenges in Measuring National Income:

- **Unreported Economic Activities:** Informal sectors and black-market transactions are often not recorded.
- **Double Counting:** Goods counted multiple times at different stages of production can lead to errors.
- **Non-Monetary Transactions:** Household labor and barter trade are difficult to include in national income calculations.
- **Inflation Adjustments:** Changes in price levels must be considered to get an accurate real income measure.

Conclusion:

National income measurement is crucial for economic planning, policymaking, and comparing economic progress over time and between countries. Each method provides valuable insights into different aspects of an economy.

UNIT – 5

ONE MARK:

1. **What is Gross Domestic Product (GDP)?**

- GDP is the total monetary value of all final goods and services produced within a country's borders in a specific period.

2. **What is Gross National Product (GNP)?**

- GNP is the total value of all final goods and services produced by a country's residents, including income from abroad.

3. **What is Net National Product (NNP)?**

- NNP is GNP minus depreciation (capital consumption allowance).

4. **What is Net Domestic Product (NDP)?**

- NDP is GDP minus depreciation.

5. **What is Private Income?**

- Private income is the total income received by private individuals and firms, including factor income and transfer payments.

6. **What is Personal Income?**

- Personal income is the total income received by individuals before the deduction of direct taxes.

7. **What is Per Capita Income?**

- It is the average income per person in a country, calculated as National Income divided by the total population.

8. **What is Real National Income?**

- It is national income adjusted for inflation, measured at constant prices.

9. **What is Nominal National Income?**

- It is national income measured at current market prices without adjusting for inflation.

10. **What are the three methods of measuring national income?**

- **Production Method, Income Method, and Expenditure Method.**

11. **What is the circular flow of income?**

- It represents the movement of money, goods, and services between different sectors of the economy.

12. **What is the difference between GDP at market price and GDP at factor cost?**

- GDP at **market price** includes **indirect taxes and subsidies**, while GDP at **factor cost** is the net income earned by factors of production.

13. **What is the difficulty in measuring national income from the production method?**
 - **Double counting** of goods at multiple stages of production.
14. **Which sector is included in a two-sector economy?**
 - Households and firms.
15. **What additional sector is included in a three-sector economy?**
 - The government sector.
16. **What additional sector is included in a four-sector economy?**
 - The foreign sector (exports and imports).
17. **What is the significance of national income in economic welfare?**
 - It helps in assessing the **standard of living** and economic progress of a nation.
18. **What is the role of indirect taxes in GDP calculation?**
 - Indirect taxes increase GDP at **market price** but do not affect GDP at **factor cost**.
19. **How does transfer income differ from factor income?**
 - **Transfer income** (like pensions and scholarships) is unearned, while **factor income** is earned from productive activities.
20. **Why is per capita income a better measure than GDP for economic welfare?**
 - It reflects the average income per person, giving a clearer picture of **individual well-being**.

TWO MARK:

1. Define Gross Domestic Product (GDP).

GDP refers to the total monetary value of all final goods and services produced within a country's borders over a specific period, usually a year. It includes production by both domestic and foreign firms operating within the country. GDP does not account for income earned from abroad.

2. Differentiate between GDP and GNP.

GDP (Gross Domestic Product) measures the total value of goods and services produced within a country. In contrast, GNP (Gross National Product) includes GDP plus net income from abroad (income earned by residents from foreign sources minus income earned by foreigners within the domestic economy).

3. What is Net Domestic Product (NDP)?

NDP is derived by subtracting depreciation (capital consumption allowance) from GDP. It accounts for the wear and tear of capital assets used in production and provides a more accurate measure of a nation's productive capacity.

4. Explain Net National Product (NNP).

NNP is obtained by subtracting depreciation from GNP. It represents the actual production value after considering capital depreciation, showing the net output available for consumption and investment.

5. What is the significance of Personal Income?

Personal income represents the total earnings received by individuals before the deduction of direct taxes. It includes wages, salaries, rent, dividends, and transfer payments (like pensions and social security). It helps in assessing the purchasing power of individuals in an economy.

6. Define Private Income.

Private income includes all income earned by individuals and private enterprises, including factor incomes (wages, rent, interest, and profit) and transfer incomes (gifts, remittances, etc.). Unlike national income, it also includes transfer payments.

7. What is Per Capita Income, and why is it important?

Per Capita Income is the national income divided by the total population of a country. It is used as an indicator of a country's economic well-being and standard of living. A higher per capita income generally suggests a better standard of living.

8. Explain the difference between Real National Income and Nominal National Income.

Nominal National Income is measured at current market prices, without adjusting for inflation. In contrast, Real National Income is adjusted for inflation and calculated using constant prices. Real income gives a more accurate measure of economic growth.

9. What are the three methods of measuring national income?

National income can be measured using:

- **Production Method:** Calculates total value-added in production.
- **Income Method:** Sums up all income earned by factors of production.
- **Expenditure Method:** Measures total spending on goods and services.

10. What is the circular flow of income?

The circular flow of income describes how money moves through different sectors of an economy. In a two-sector model, households provide factors of production to firms and receive income, which they spend on goods and services. This flow expands in three-sector and four-sector models by including government and foreign trade.

11. What is the concept of a two-sector economy?

A two-sector economy consists of households and firms. Households provide labor and capital to firms, which produce goods and services. The money received by households (as wages, rent, interest, and profit) is spent on goods and services produced by firms, creating a circular flow.

12. What additional sector is included in a three-sector economy?

A three-sector economy includes the government sector along with households and firms. The government collects taxes, spends on public services, and redistributes income through subsidies and welfare programs, influencing national income.

13. How does a four-sector economy function?

A four-sector economy includes the foreign sector along with households, firms, and the government. It accounts for exports and imports, foreign investments, and international financial transactions, making it a more comprehensive economic model.

14. Explain the difficulties in measuring national income using the production method.

Measuring national income through the production method faces challenges like double counting,

valuation of non-market activities, underground economy activities, and fluctuations in prices, which can distort the real value of national income.

15. What are the difficulties in measuring national income using the income method?

The income method faces challenges such as excluding non-monetary transactions, underreporting of income (tax evasion), and difficulties in distinguishing factor income from transfer income.

16. What is the role of indirect taxes in GDP calculation?

GDP at market prices includes indirect taxes, which increase the cost of goods and services. However, GDP at factor cost does not include indirect taxes, providing a clearer picture of production earnings.

17. What is the importance of national income in economic planning?

National income statistics help governments in formulating economic policies, setting growth targets, assessing employment levels, and designing welfare programs to improve economic conditions.

18. How does national income affect economic welfare?

National income indicates the total production of a country, but its impact on economic welfare depends on distribution, inflation levels, and availability of essential goods and services. A higher national income does not always mean improved living standards if income inequality is high.

19. What is the relationship between GDP and employment?

A higher GDP often leads to more employment opportunities, as increased production requires more labor. However, capital-intensive industries may increase GDP without significantly boosting employment.

20. Why is transfer income not included in national income?

Transfer incomes (like pensions, scholarships, and gifts) do not contribute to production; hence, they are excluded from national income calculation. Only factor incomes earned from productive activities are included.

21. What is the expenditure approach to measuring national income?

The expenditure approach calculates national income by summing all expenditures on final goods and services, including consumption, investment, government spending, and net exports.

22. Why is per capita income not always a reliable indicator of economic welfare?

Per capita income does not consider income inequality, cost of living, or social welfare provisions. Two countries with similar per capita income can have vastly different living standards due to these factors.

23. What is the difference between factor cost and market price?

GDP at factor cost includes only payments to factors of production, while GDP at market price includes taxes and subsidies, affecting the final prices consumers pay.

24. What is the role of depreciation in national income accounting?

Depreciation accounts for the reduction in the value of capital goods over time. It is deducted from GDP or GNP to get NDP or NNP, showing a more realistic income measure.

25. Why is underground economic activity a problem in national income measurement?

The underground economy, including informal labor and black-market transactions, is not recorded in official statistics, leading to an underestimation of national income.

26. How does inflation affect national income measurement?

Inflation increases nominal GDP but does not reflect real growth. Real GDP, adjusted for inflation, provides a more accurate measure of economic performance.

27. Why is Gross National Income (GNI) a better measure than GDP for some countries?

GNI includes income from abroad, which is important for countries with large expatriate populations or multinational corporations operating overseas.

28. What is the difference between Gross Domestic Income (GDI) and GDP?

GDI measures total income earned within a country, while GDP measures the total value of goods and services produced. In theory, they should be equal, but statistical discrepancies may arise.

29. How does foreign trade impact national income?

Exports increase national income by bringing in revenue, while imports reduce it as money flows out. A trade surplus boosts GDP, while a trade deficit can lower it.

30. What is the impact of subsidies on national income?

Subsidies lower the cost of production and increase GDP at factor cost. They help boost production and reduce the burden on consumers but require government funding.

BOARD ANSWER:

Circular Flow of Income: 2 Sector, 3 Sector and 4 Sector Economy:

Circular Income Flow in a Two Sector Economy:

Real flows of resources, goods and services have been shown in Fig. 6.1. In the upper loop of this figure, the resources such as land, capital and entrepreneurial ability flow from households to business firms as indicated by the arrow mark.

In opposite direction to this, money flows from business firms to the households as factor payments such as wages, rent, interest and profits.

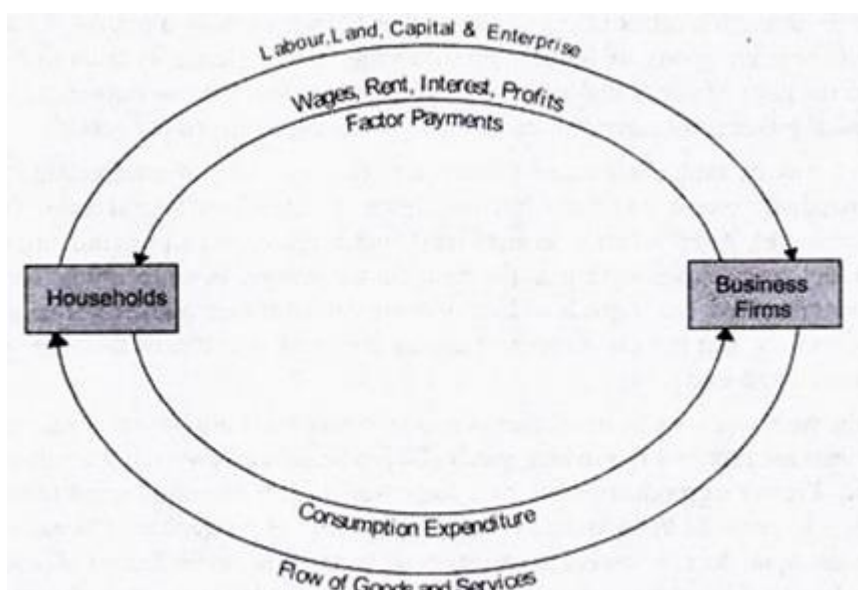


Fig. 6.1. Circular Flow of Income in a Simple Two Sector Economy

In the lower part of the figure, money flows from households to firms as consumption expenditure made by the households

on the goods and services produced by the firms, while the flow of goods and services is in opposite direction from business firms to households.

Thus, we see that money flows from business firms to households as factor payments and then it flows from households to firms. Thus, there is, in fact, a circular flow of money or income. This circular flow of money will continue indefinitely week by week and year by year. This is how the economy functions. It may, however, be pointed out that this flow of money income will not always remain the same in volume.

In other words, the flow of money income will not always continue at a constant level. In year of depression, the circular flow of money income will contract, i.e., will become lesser in volume, and in years of prosperity it will expand, i.e., will become greater in volume.

This is so because the flow of money is a measure of national income and will, therefore, change with changes in the national income. In year of depression, when national income is low, the volume of the flow of money will be small and in years of prosperity when the level of national income is quite high, the flow of money will be large.

In order to make our analysis simple and to explain the central issues involved, we take many assumptions. In the first place, we assume that neither the households save from their incomes, nor the firms save from their profits. We further assume that the government does not play any part in the national economy.

In other words, the government does not receive any money from the people by way of taxes, nor does the government spend any money on the goods and services produced by the firms or on the resources and services supplied by the households. Thirdly, we assume that the economy neither imports goods and services, nor exports anything. In other words, in our above analysis we have not taken into account the role of foreign trade. In fact we have explained above the flow of money that occurs in the functioning of a closed economy with no savings and no role of government.

Circular Income Flow with Saving and Investment:

In our above analysis of the circular flow of income we have assumed that all income which the households receive, they spend it on consumer goods and services. A result, circular flow of money speeding and income remains undiminished. We will now explain if households save a part of their income, how their savings will affect money flows in the economy.

When households save, their expenditure on goods and services will decline to that extent and as a result money flow to the business firms will contract. With reduced money receipts, firms will hire fewer workers (or lay off some workers) or reduce the factor payments they make to the suppliers of factors such as workers.

This will lead to the fall in total incomes of the households. Thus, savings reduce the flow of money expenditure to the business firms and will cause a fall in economy's total income. Economists therefore call savings a leakage from the money expenditure flow.

But savings by households need not lead to reduced aggregate spending and income if they find their way back into flow of expenditure. In free market economies there exists a set of institutions such as banks, insurance companies, financial houses, stock markets where households deposit their savings. All these institutions together are called financial institutions or financial market. We assume that all the savings of households come in the financial market. We further assume that there are no inter-households borrowings.

It is business firms who borrow from the financial market for investment in capital goods such as machines, factories, tools and instruments, trucks. Firms spend on investment in order to expand their productive capacity in future.

Thus, through investment expenditure by borrowing the savings of the households deposited in financial market, are again brought into the expenditure stream and as a result total flow of spending does not decrease. Circular money flow with saving and investment is illustrated in Fig. 6.2 where in the middle part a box representing financial market is drawn. Money flow of savings is shown from the households towards the financial market. Then flow of investment expenditure is shown as borrowing by business firms from the financial market.

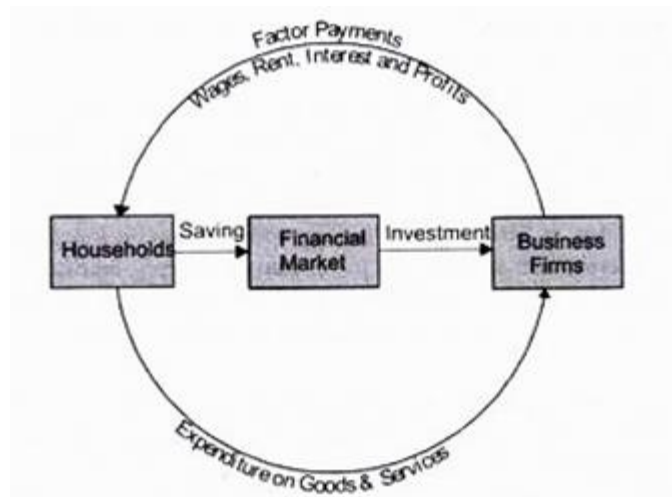


Fig. 6.2. Circular Money Flow with Saving and Investment

Condition for the Constancy of Circular Income Flow:

Now the question arises what is the condition for the flow of money income to continue at a steady level so that it makes possible the production and subsequent flow of a given volume of goods and services at constant prices. To explain this we have to introduce saving and investment in the analysis of circular flow of income.

Saving a part of income means it is not spent on consumer goods and services. In other words, saving is withdrawal of some money from the income flow. On the other hand, investment means some money is spent on buying new capital goods to expand production capacity. In other words, investment is injection of some money in circular flow of income.

For the circular flow of income to continue unabated, the withdrawal of money from the income stream by way of saving must equal injection of money by way of investment expenditure. Therefore, planned savings must be equal to planned investment if the constant money income flow in an economy is to be obtained.

Now, what will happen if planned investment expenditure falls short of the planned savings? As a result of fall in planned investment expenditure, income, output and employment will fall and therefore the flow of money will contract.

If the equality between planned savings and planned investment is disturbed by increase in savings, then the immediate effect will be that the stocks of goods lying in the shelves of the shops will increase (as some of the goods will not be sold due to the fall in consumption i.e., increase in savings). Owing to the deficiency of demand for goods and the accumulation of stocks, retailers will

place small orders with the wholesalers. Consequently, smaller amount of goods will be produced and therefore fewer capital goods like machinery will be indeed with the result that fixed investment will tend to fall.

Thus, the ultimate effect of either the fall in planned investment or the increase in planned savings is the same, namely, the fall in income, output, employment and prices with the result that the flow of money will contract.

On the other hand, if the equality between planned savings and planned investment is disturbed by the increase in investment demand, the result will be increase in income, output and employment. Consequently, the flow of money income will expand.

It is thus clear from the above analysis that the flow of money income will continue at a constant level only when the condition of equality between planned saving and investment is satisfied. It was believed by classical economists that financial market provides a mechanism which coordinates the savings of households and the investment expenditure, by the firms. Rate of interest, which is the price for the use of savings, is determined by saving and investment.

If savings exceed investment expenditure, rate of interest falls so that, at a lower rate of interest, investment increases and both become equal. On the contrary, if investment expenditure is greater than savings, rate of interest will rise so that at a higher rate of interest savings increase and become equal to planned investment expenditure.

However, an eminent British economist J.M. Keynes refuted the above argument that changes in rate of interest will cause saving and investment to become equal. According to him, since in a free market capitalist economy, investment is made by business enterprises and savings are mostly done by households and for different reasons, there is no guarantee that planned investment will be equal to planned savings and thus fluctuations in income, output and employment are inevitable.

As a result, circular flow of income does not continue at a steady level in a free-enterprise capitalist economy unless certain corrective and preventive steps are taken by the government to maintain stability in the economy.

Saving-Investment Identity in National Income Accounts in a Two Sector Economy:

Despite the fact that people who save are different from the business firms which primarily invest, in national income accounts savings are identical or always equal to investment in a simple two sector economy having no roles of Government and foreign trade. This is a basic identity in national income accounts which needs to be carefully understood.

Of course, in our above analysis of circular flow of income, we explained that planned investment by business firms can differ from savings by household. But in that analysis we referred to planned or intended investment and savings which often differ and affect the flow of national income.

However, in national income accounts we are concerned with actual saving and actual investment. It is these actual or realised saving and investment that are identical in national income accounts. We can prove their identity in the following way.

In a simple economy which has neither government, nor foreign trade, the value of output produced which we denote by Y is equal to the value of output sold. Since the value of output sold in a simple two sector economy is equal to the sum of consumption expenditure and investment expenditure we have $y = C + I$ where Y = Value of aggregate output, C = Consumption expenditure and I = Investment expenditure.

A pertinent question which arises here is what happens to the unsold output. The unsold output leads to the increase in the inventories of goods and in national income accounting increase in inventories of goods is treated as a part of actual investment. This may be considered as the firms selling the goods to themselves to add to their inventories. Thus, gross national product (GNP) produced is used either for consumption or for investment.

Now, look at the gross national product or income in the simple economy from the viewpoint of its allocation between consumption and saving. Since national income (which is equal to GNP) can be either consumed or saved,. We have $Y \equiv C + S$

From the identities (i) and (ii) we get

$$C + I \equiv Y \equiv C + S$$

The left hand side of the identity (iii), namely $C + I = Y$ shows the components of aggregate demand (that is, aggregate expenditure on goods and services produced) and the right-hand side of the identity (iii) namely $Y = C + S$ shows the allocation of national income to either consumption or saving. Thus, the identity (iii) shows that the value of output produced or sold is equal to the total income received. It is income received that is spent on goods and services produced.

Now subtracting the consumption (C) from both sides of the identity (iii) we have

$$I \equiv Y - C \equiv S$$

$$\text{or } I = S$$

Thus, in our two sector simple economy with neither government, nor foreign trade, investment is identically equal to saving.

Circular Income Flow in a Three Sector Economy with Government:

In our above analysis of money flow, we have ignored the existence of government for the sake of making our circular flow model simple. This is quite unrealistic because government absorbs a good part of the incomes earned by households. Government affects the economy in a number of ways.

Here we will concentrate on its taxing, spending and borrowing roles. Government purchases goods and services just as households and firms do. Government expenditure takes many forms including spending on capital goods and infrastructure (highways, power, communication), on defence goods, and on education and public health and so on. These add to the money flows which are shown in Fig. 6.3 where a box representing Government has been drawn. It will be seen that government purchases of goods and services from firms and households are shown as flow of money spending on goods and services.

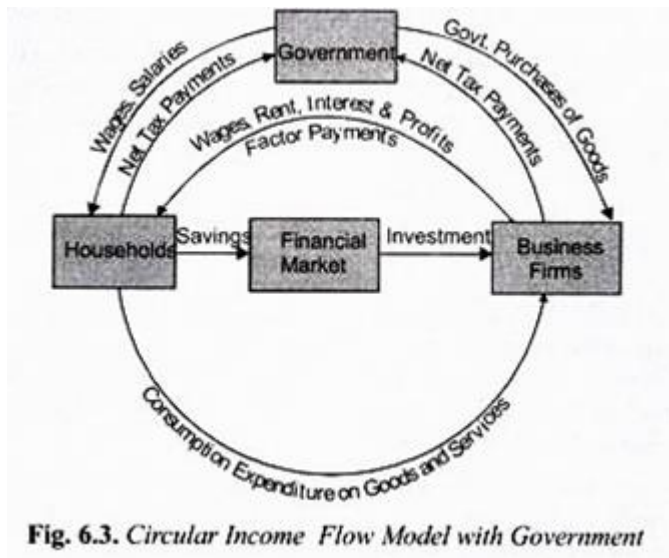


Fig. 6.3. Circular Income Flow Model with Government

Government expenditure may be financed through taxes, out of assets or by borrowing. The money flow from households and business firms to the government is labelled as tax payments in Fig. 6.3. This money flow includes all the tax payments made by households less transfer payments received from the Government. Transfer payments are treated as negative tax payments.

Another method of financing Government expenditure is borrowing from the financial market. This can be represented by the money flow from the financial market to the Government and is labelled as Government borrowing (To avoid confusion we have not drawn this money flow from financial market to the Government). Government borrowing increases the demand for credit which causes rate of interest to rise.

The government borrowing through its effect on the rate of interest affects the behaviour of firms and households. Business firms consider the interest rate as cost of borrowing and the rise in the interest rate as a result of borrowing by the Government lowers private investment. However, households who view the rate of interest as return on savings feel encouraged to save more.

It follows from above that the inclusion of the Government sector significantly affects the overall economic situation. Total expenditure flow in the economy is now the sum of consumption expenditure (denoted by C), investment expenditure (I) and Government expenditure (denoted by G). Thus

$$\text{Total expenditure (E)} = C + I + G \dots\dots(i)$$

Total income (K) received is allocated to consumption (C), savings (S) and taxes (T). Thus

$$Y = C + S + T \dots (ii)$$

Since expenditure made must be equal to the income received (Y), from equations (i) and (ii) above we have

$$C + I + G = C + S + T \dots (iii)$$

Since C occurs on both sides of the equation (iii) and will therefore be cancelled out, we have

ADVERTISEMENTS:

$$I + G = S + T \dots(iv)$$

By rearranging we obtain

$$G - T = S - I \dots (v)$$

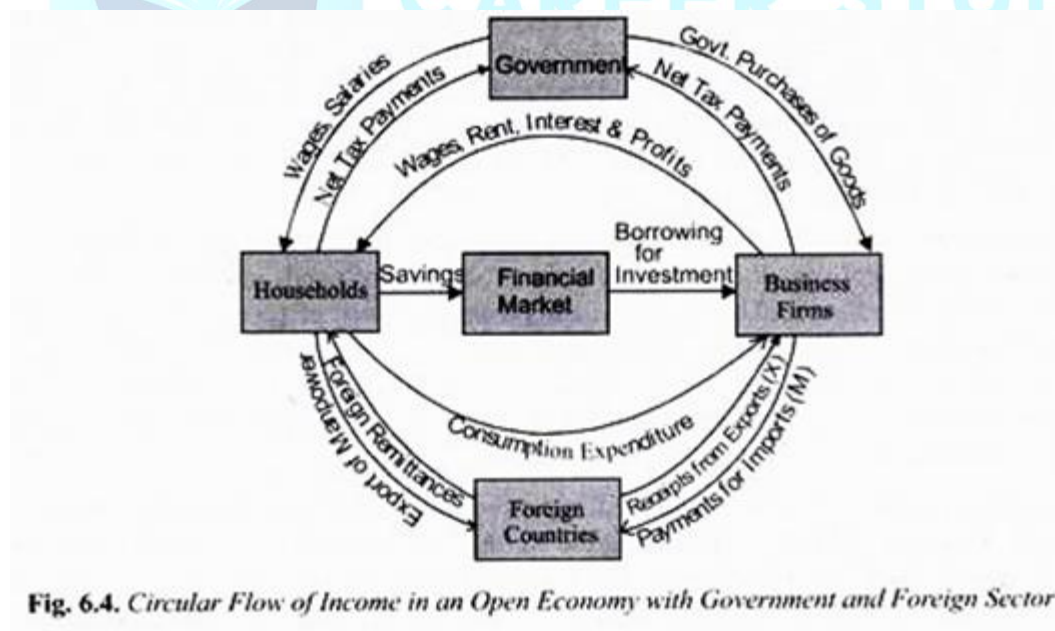
Equation (v) is very significant as it depicts what would be the consequences if government budget is not balanced, that is, if Government expenditure (G) is greater than the tax revenue (T), that is, $G > T$, the government will have a deficit budget. To finance the deficit budget, the Government will borrow from the financial market.

For this purpose, then private investment by business firms must be less than the savings of the households. Thus Government borrowing reduces private investment in the economy. In other words, Government borrowing crowds out private investment.

Money Income Flows in the Four Sector Open Economy: Adding Foreign Sector:

We now turn to explain the money flows that are generated in an open economy, that is, economy which have trade relations with foreign countries. Thus, the inclusion of the foreign sector will reveal to us the interaction of the domestic economy with foreign countries. Foreigners interact with the domestic firms and households through exports and imports of goods and services as well as through borrowing and lending operations through financial market. Goods and services produced within the domestic territory which are sold to the foreigners are called exports.

On the other hand, purchases of foreign-made goods and services by domestic households are called imports. Figure 6.4 illustrates additional money flows that occur in the open economy when exports and imports also exist in the economy. In our analysis, we assume it is only the business firms of the domestic economy that interact with foreign countries and therefore export and import goods and services.



A flow of money spending on imports have been shown to be occurring from the domestic business firms to the foreign countries (i.e., rest of the world). On the contrary, flow of money expenditure on exports of a domestic economy has been shown to be taking place from foreign countries to the business firms of the domestic economy.

If exports are equal to the imports, then there exists a balance of trade. Generally, exports and imports are not equal to each other. If value of exports exceeds the value of imports, trade surplus

occurs. On the other hand if value of imports exceeds value of exports of a country, trade deficit occurs.

In the open economy there is interaction between countries not only through exports and imports of goods and services but also through borrowing and lending funds or what is also called financial market. These days financial markets around the world have become well integrated.

When there is a trade surplus in the economy, that is, when exports (X) exceed imports (M), net capital inflow will take place. By net capital inflow we mean foreigners will borrow from domestic savers to finance their purchases of domestic exports. In this way as a result of net capital inflow domestic savers will lend to foreigners, that is, acquire foreign financial assets.

On the contrary, in case of import surplus, that is, when imports are greater than exports, trade deficit will occur. Therefore, in case of trade deficit, domestic consumer households and business firms will borrow from abroad to finance their excess of imports over exports. As a result, foreigners will acquire domestic financial assets.

From the circular flows that occur in the open economy the national income must be measured by aggregate expenditure that includes net exports, that is, $X-M$ where X represents exports and M represents imports. Imports must be subtracted from the total expenditure on foreign produced goods and services to get the value of net exports. Thus, in the open economy

$$\text{National Income} = C + I + G + NX$$

where NX represents net exports, $X-M$.

Since national income can be either consumed, saved or paid as taxes to the Government we have

$$C + I + G + NX = C + S + T$$

1. Define Gross Domestic Product (GDP) and explain its significance.

Gross Domestic Product (GDP) is the total monetary value of all final goods and services produced within a country's borders in a given period, usually a year. It includes production by both domestic and foreign firms operating within the country.

Significance of GDP:

- **Measure of Economic Performance:** GDP helps assess the overall economic health of a country.
- **Comparison Between Economies:** It allows comparison of different economies based on their production levels.
- **Policy Formulation:** Governments use GDP data to plan economic policies, investments, and employment strategies.
- **Indicator of Living Standards:** A higher GDP often indicates better employment opportunities and improved living conditions.

2. Differentiate between Gross Domestic Product (GDP) and Gross National Product (GNP).

Gross Domestic Product (GDP):

- Measures the total value of goods and services produced within a country's borders.
- Includes production by both domestic and foreign firms inside the country.
- It does not include income earned from abroad.

Gross National Product (GNP):

- Measures the total value of goods and services produced by the residents of a country, including income earned from abroad.
- Excludes income earned by foreigners within the domestic economy.
- $GNP = GDP + \text{Net Factor Income from Abroad (NFIA)}$.

Example: If Indian companies earn income from businesses in the USA, it is included in India's GNP but not in its GDP.

3. Explain the different methods of measuring national income.

There are three primary methods to measure national income:

(i) Production Method:

- This method calculates the total value of goods and services produced in an economy.
- It focuses on value addition at each stage of production to avoid double counting.
- **Formula:** $\text{National Income} = \text{Value of Output} - \text{Value of Intermediate Goods}$

(ii) Income Method:

- This method sums up all factor incomes earned in an economy, such as wages, rent, interest, and profits.
- **Formula:** $\text{National Income} = \text{Rent} + \text{Wages} + \text{Interest} + \text{Profits}$

(iii) Expenditure Method:

- It calculates national income by summing all expenditures on final goods and services.
- **Formula:** $\text{National Income} = \text{Consumption Expenditure} + \text{Investment Expenditure} + \text{Government Expenditure} + \text{Net Exports}$

Each method provides a different perspective on the economy but should theoretically yield the same national income figure.

4. What are the difficulties in measuring national income?

Measuring national income accurately is challenging due to various factors:

(i) Existence of the Informal Sector:

- Many economic activities, such as household labor and small-scale businesses, are not recorded officially.

- The underground economy (black market transactions) is difficult to track.

(ii) Double Counting:

- If intermediate goods are counted along with final goods, it leads to inflation of national income figures.
- Proper accounting is needed to consider only the value-added at each stage of production.

(iii) Problems in Data Collection:

- Accurate data on production, income, and expenditure is often unavailable or inconsistent.
- Developing countries face issues like lack of proper record-keeping.

(iv) Non-Market Transactions:

- Many goods and services, such as household work or barter trade, are not included in national income calculations.
- This leads to an underestimation of actual economic activities.

(v) Changing Prices (Inflation):

- Inflation can distort GDP figures, making it difficult to compare economic performance over time.
- Using constant prices (Real GDP) is necessary to get an accurate picture.

5. Explain the concept of Per Capita Income and its importance.

Definition:

Per Capita Income is the national income of a country divided by its total population. It represents the average income of an individual in the economy.

Formula:

$$\text{Per Capita Income} = \frac{\text{National Income}}{\text{Total Population}}$$

Importance of Per Capita Income:

- **Indicator of Living Standards:** A higher per capita income generally suggests a better standard of living.
- **Comparison Between Countries:** It allows comparison of economic well-being between different nations.
- **Policy Formulation:** Governments use this measure to frame policies related to poverty, taxation, and economic development.

Limitations:

- **Does Not Show Income Distribution:** A high per capita income does not necessarily mean that wealth is distributed equally.

- **Does Not Consider Inflation:** If prices rise, the real purchasing power may remain low despite higher per capita income.
-

6. Explain the concept of the circular flow of income in a two-sector, three-sector, and four-sector economy.

(i) Two-Sector Economy (Households and Firms):

- Households provide factors of production (labor, land, capital) to firms.
- Firms pay income (wages, rent, interest, profit) to households.
- Households use their income to purchase goods and services from firms.
- This creates a continuous flow of income and expenditure.

(ii) Three-Sector Economy (Households, Firms, Government):

- In addition to households and firms, the government plays a role.
- The government collects taxes and spends on public goods and services.
- Government transfers (like pensions, subsidies) also influence the flow of income.

(iii) Four-Sector Economy (Including Foreign Sector):

- The foreign sector includes exports and imports.
 - Exports bring income into the economy, while imports result in an outflow of money.
 - Foreign investments also impact national income by bringing in capital from abroad.
-

7. What is the difference between Real National Income and Nominal National Income?

Nominal National Income:

- It is measured at current market prices without adjusting for inflation.
- Fluctuations in prices can distort the real economic situation.
- It does not reflect changes in purchasing power over time.

Real National Income:

- It is calculated using constant prices, adjusted for inflation.
- Provides a more accurate measure of economic growth.
- Helps in comparing economic performance across different years.

Formula to Convert Nominal GDP to Real GDP:

$$\text{Real GDP} = \frac{\text{Nominal GDP}}{\text{Price Index}} \times 100$$

Example: If the nominal GDP of a country increases by 10% but inflation rises by 8%, the real GDP growth is only 2%.

8. How does national income impact economic welfare?

National income is an important measure of a country's economic well-being, but it does not always reflect true economic welfare due to several factors:

(i) Income Distribution:

- If income is concentrated among a few people, national income may be high, but overall welfare may remain low.
- Equitable distribution of income is essential for economic welfare.

(ii) Non-Market Activities:

- Many useful services, such as household work and volunteer services, are not included in national income but contribute to welfare.

(iii) Environmental Factors:

- A high GDP with pollution and resource depletion reduces welfare.
- Sustainable economic growth ensures better living standards.

(iv) Cost of Living:

- Higher national income does not always mean better living conditions if the cost of essential goods and services is high.

(v) Leisure and Work-Life Balance:

- If an economy has high productivity but people work excessively long hours, economic welfare may not improve.

Conclusion: National income is a useful indicator of economic progress, but other factors such as income distribution, environmental sustainability, and quality of life should also be considered when measuring overall welfare.



CAREER STUDY
The Learning App



CAREER STUDY
The Learning App



SUPPORT US:

PLAY STORE – CAREER STUDY

YOUTUBE – CAREER STUDY

FACEBOOK – CAREER STUDY

WHATSAPP – CAREER STUDY



LEARN. GROW. SUCCEED.