



## UG-ARTWORKS:

### ELEMENTARY MICROECONOMICS COURSEHACK

#### The 5 Core Laws of Microeconomics

##### 1. Law of Demand

- When the price of a good goes up, people buy less of it, and when the price goes down, people buy more. *This is because consumers substitute expensive products for cheaper ones. This law holds true ceteris paribus (all other factors constant).*

##### 2. Law of Supply

- When the price of a good goes up, producers are willing to supply more of it, and when the price goes down, they supply less. *This is because producers seek to maximize profits.*

##### 3. Law of Diminishing Marginal Returns

- As more and more of a variable input (like labor) is added to a fixed input (like land), the additional output (marginal product) from each new unit of the variable input will eventually decrease. *For example, adding too many workers to a small plot of land may cause them to get in each other's way, reducing overall efficiency.*

##### 4. Law of Diminishing Marginal Utility

- As a person consumes more units of a good, the additional satisfaction (marginal utility) gained from consuming each next unit decreases. *People's want for something reduces as they get more of it.*

##### 5. Law of Equilibrium

- In a free market, the price will adjust until the quantity demanded equals the quantity supplied.
- If the price is too high, a surplus occurs, leading sellers to lower the price.
- If the price is too low, a shortage occurs, leading sellers to raise the price.
- Equilibrium is the point where there is no inherent tendency for the price to change.

## What You Need to Understand to be a Confident Economist

### i. Core Understanding

- Explain scarcity, choice, and opportunity cost in your own words.
- Know the difference between micro and macro economics.
- Describe how demand and supply interact to set prices.

### ii. Consumer Theory

- Understand utility (satisfaction) and why it decreases with more consumption (diminishing marginal utility).
- Understand the budget constraint (limited income, unlimited wants).

- Explain demand elasticity (how sensitive quantity demanded is to changes in price or income).

### iii. Production and Costs

- Understand total product, marginal product, and average product.
- Describe the law of diminishing returns without using graphs.
- Understand the difference between short run (some inputs fixed) and long run (all inputs variable).
- Explain fixed cost, variable cost, total cost, average cost, and marginal cost and how they behave.

### iv. Market Structure

- Differentiate between perfect competition, monopoly, monopolistic competition, and oligopoly.
- Explain how prices and profits differ across these market structures.

### v. Market Failures

- Understand what happens when markets don't work efficiently (externalities, public goods, etc.).

- Understand how the government can correct market failures (taxes, subsidies, price controls).

vi. Application (To Be a Top-Level Student)

- Relate every topic to real-world examples (e.g., Maize, Airtel, ESCOM, ADMARC in Malawi).
- Solve short numerical questions (e.g., finding marginal product or elasticity).
- Explain the logic of a graph even without seeing it.

## **MICROECONOMICS REVISION KIT**

### **1. FOUNDATIONS**

#### **a. ECONOMICS**

- The study of how individuals and firms allocate scarce resources to satisfy unlimited wants.

#### **b. SCARCITY**

- The fundamental economic problem of having seemingly unlimited human wants in a world of limited resources.

#### c. OPPORTUNITY COST

- The value of the next best alternative that must be forgone when making a choice.

#### d. MICROECONOMICS

- The branch of economics that studies the behaviour of individuals and firms in making decisions regarding the allocation of scarce resources.

#### e. MACROECONOMICS

- The branch of economics that studies the behaviour and performance of an economy as a whole (*e.g., national income, inflation*).

### ***The 3 Key Agents in an Economy:***

1. **Households:** *Consume goods and services and supply labor.*
2. **Firms:** *Produce goods and services and demand labor.*
3. **Government:** *Regulates, taxes, and spends.*

## **2. DEMAND AND SUPPLY**

### **❖ LAW OF DEMAND**

- States that, *ceteris paribus*, an increase in price leads to a decrease in quantity demanded, and vice versa. (*e.g., if the price of maize increases, people buy less maize*).

#### ❖ LAW OF SUPPLY

- States that, *ceteris paribus*, an increase in price leads to an increase in quantity supplied, and vice versa. (*e.g., if tomato prices rise, farmers plant more tomatoes*).

#### ❖ EQUILIBRIUM

- The point where the demand and supply curves intersect; quantity demanded equals quantity supplied (*no surplus or shortage*).

#### ❖ SHIFT IN DEMAND

- A change in demand caused by factors other than price, such as income, tastes, or prices of related goods. (*e.g., if income rises, demand for normal goods like rice increases*).

#### ❖ SHIFT IN SUPPLY

- A change in supply caused by factors other than price, such as production costs, technology, or natural conditions. (*e.g., a shortage of fertilizer leads to a lower supply of maize*).

### 3. ELASTICITY

- Elasticity measures the responsiveness of one variable to changes in another.

#### A. PRICE ELASTICITY OF DEMAND (PED)

- Measures the sensitivity of quantity demanded to a change in price.

➤ **Formula:**  $PED = (\% \text{ Change in Quantity Demanded}) / (\% \text{ Change in Price})$

➤ **Interpretation:**

➤  $PED > 1$ : Elastic Demand (quantity is highly responsive to price).

➤  $PED < 1$ : Inelastic Demand (quantity is not very responsive to price).

➤  $PED = 1$ : Unit Elastic.

➤  $PED = 0$ : Perfectly Inelastic.

➤  $PED = \infty$ : Perfectly Elastic.

## B. INCOME ELASTICITY OF DEMAND (YED)

- Measures the response of demand to a change in income.

· **Formula:**  $YED = (\% \text{ Change in Quantity Demanded}) / (\% \text{ Change in Income})$

➤ **Interpretation:**

➤  $YED > 0$ : Normal Good (demand increases as income rises).

➤  $YED < 0$ : Inferior Good (demand decreases as income rises).

## C. CROSS-PRICE ELASTICITY OF DEMAND (XED)

- Measures the change in demand for one good due to a change in the price of another good.

· **Formula:**  $XED = (\% \text{ Change in Quantity Demanded of Good A}) / (\% \text{ Change in Price of Good B})$

➤ **Interpretation:**

- $XED > 0$ : The goods are Substitutes (e.g., Airtel vs. TNM airtime).
- $XED < 0$ : The goods are Complements (e.g., phones and mobile data).

**Note on Total Revenue and Elasticity:**

- If demand is elastic, an increase in price leads to a decrease in total revenue.
- If demand is inelastic, an increase in price leads to an increase in total revenue.

## 4. PRODUCTION

### a. Total Product (TP)

- The total quantity of output produced.

### b. Marginal Product (MP)

- The extra output produced by using one more unit of a variable input.
- Formula:  $MP = \Delta TP / \Delta L$

### c. Average Product (AP)

- The output per unit of input.
- Formula:  $AP = TP / L$

#### d. Law of Diminishing Returns

- As more of a variable input is added to a fixed input, the marginal product of the variable input will eventually diminish.

#### ***Relationship between MP and AP:***

- ***When  $MP > AP$ ,  $AP$  is rising.*** (e.g., if new workers are more productive than the current average, they pull the average up).
- ***When  $MP < AP$ ,  $AP$  is falling.*** (e.g., if new workers are less productive than the current average, they pull the average down).
- ***When  $MP = AP$ ,  $AP$  is at its maximum.***

### 5. COST OF PRODUCTION

#### a. Fixed Cost (FC)

- Costs that do not vary with the level of output (e.g., rent).

#### b. Variable Cost (VC)

- Costs that do vary with the level of output (e.g., wages, raw materials).

#### c. Total Cost (TC)

- The sum of fixed and variable costs. ( $TC = FC + VC$ ).

#### d. Average Cost (AC)

- The cost per unit of output.

❖ **Formula:**  $AC = TC / Q$

#### e. Marginal Cost (MC)

- The additional cost of producing one more unit of output.

❖ **Formula:**  $MC = \Delta TC / \Delta Q$

#### ***Relationship between MC and AC:***

- ***When  $MC < AC$ , AC is falling.*** (The cost of producing the next unit is cheaper than the average, so it brings the average down).
- ***When  $MC > AC$ , AC is rising.*** (The cost of producing the next unit is more expensive than the average, so it pushes the average up).
- ***The MC curve always intersects the AC curve at its minimum point.***

## **6. MARKET STRUCTURES**

### a. **PERFECT COMPETITION:**

- Many firms, identical products, no barriers to entry, price takers.
- Example:** Local tomato market.

### b. **MONOPOLY:**

- One single seller, unique product, high barriers to entry, price maker.
- Example:** ESCOM, Water Board Malawi.

### c. **MONOPOLISTIC COMPETITION:**

i. Many firms, differentiated products (*e.g., by brand, quality*), low barriers to entry.

ii. **Example:** *Bakeries, salons, restaurants.*

d. **OLIGOPOLY:**

i. Few large firms, standardized or differentiated products, high barriers to entry, firms are interdependent.

ii. **Example:** *Airtel and TNM (telecommunications).*

## 7. MARKET FAILURES AND GOVERNMENT INTERVENTION

### A. EXTERNALITIES

❖ **Problem:**

- Costs or benefits of a transaction spill over to third parties not involved.

Markets tend to overproduce goods with negative externalities (*e.g., pollution from fertilizers*) and underproduce goods with positive externalities (*e.g., education*).

❖ **Government Solution:**

- Taxes on negative externalities to reduce supply; subsidies for positive externalities to increase demand.

### B. PUBLIC GOODS

❖ **Problem:**

- Goods that are non-excludable (cannot prevent people from using them) and non-rival (*one person's use doesn't reduce availability for others*). Private firms won't produce them due to the "free-rider" problem.

- **Example:** Roads, street lights, national defense.

❖ **Government Solution:**

- Direct provision by the government.

### C. INFORMATION FAILURES

❖ **Problem:**

- Buyers or sellers lack accurate information, leading to poor choices and market inefficiency.
- **Example:** Fake seeds or fertilizers in the market.

❖ **Government Solution:**

- Regulation and oversight of firms (e.g., MERA in Malawi).

### D. PRICE CONTROLS

❖ **Problem:**

- Government-imposed price limits can cause inefficiencies.

❖ **Price Ceiling (Max Price):**

- Can lead to shortages and black markets.

❖ **Price Floor (Min Price):**

- Can lead to surpluses.

### ADD-ONS & FORMULAS

❖ **Total Revenue (TR)**

- Total income from sales.

- **Formula:**  $TR = \text{Price} \times \text{Quantity}$

❖ **Profit**

- The financial gain.
- **Formula:**  $\text{Profit} = \text{Total Revenue} - \text{Total Cost}$

- ❖ A negative profit is a loss.

## ***MATHS AND FORMULA SUPPLEMENT***

### ***PRODUCTION FUNCTION***

- Shows the relationship between inputs and output.

#### **1. General Form:**

- $Y = f(X_1, X_2, X_3, \dots X_n)$
- Where Y is output and  $X_i$  are inputs (labour, capital, etc.).

#### **2. Mathematical Forms:**

##### ***i) Linear Equation (Constant Returns):***

- $Y = a + bX$
- $a$  = output with zero variable input (autonomous production).
- $b$  = marginal product (MP). It is constant in this case.

##### ***ii) Quadratic Equation (Increasing then Decreasing Returns):***

- $Y = a + bX + cX^2$

- $a$  = output with zero variable input.
- $b$  = initial productivity coefficient (positive).
- $c$  = diminishing returns parameter (usually negative).

### 3. Derivatives for AP and MP:

- ❖ For a production function  $Y = f(L)$  where  $L$  is labor:
- ❖ **Marginal Product (MP)** is the first derivative:  $MP = dY/dL$
- ❖ **Average Product (AP)** is the function itself divided by labor:  $AP = Y / L$ 
  - Example using Quadratic Form ( $Y = a + bL + cL^2$ ):
- ❖  $MP = dY/dL = b + 2cL$
- ❖  $AP = Y / L = (a + bL + cL^2) / L = a/L + b + cL$