Economics Higher Level – Section 1: Microeconomics

Unit 1.0: Introduction to Economics

Scarcity – a situation in which the resources available for producing output are insufficient to satisfy wants.

Factors of production – resources, typed into four categories.

- **Land**: the gifts of nature such as lakes, forests, minerals, wildlife
- **Labor**: the physical and mental work of people
- **Capital**: assets created for use in production of other goods
    - **Fixed capital**: durable and used time and time again, e.g. machinery
    - **Circulating capital**: used once, e.g. raw materials
- **Enterprise**: organizers and innovators

Opportunity cost – the cost of using resources for a certain purpose, in terms of the next best alternative foregone.

A **Production Possibilities Curve** (reflected below) shows all the maximum combinations of 2 goods that an economy can produce within a certain period, within a certain level of technology and when all available resources are fully and efficiently employed.

> **Capital goods** – goods such as machinery and equipment
> **Consumer goods** – consumed by people and yields satisfaction

Shifts in the PPC – an outward shift of the PPC indicates higher productive capacity (higher potential economic growth), which an inward shift denotes the opposite. Causes of economic growth include:

- Increases in the quantity of available resources
- Improvement in the quality of the resources
- Technological improvement

Productive Efficiency – a situation where the economy is producing maximum output with the given technology and resources, or producing output with the lowest possible unit costs.

Allocative Efficiency – a situation where resources are allocated in a way that no one can be made better off without another being worse off, achieving maximum community surplus. It can also be defined as when the marginal cost of each good equals the price that consumers pay **(P = MC)**.

The **Free Market Economy** – one that relies totally on the market forces of demand and supply for the allocation of resources. It answers the three economic questions.

- What and how much to produce is decided by the **signaling and incentive function of prices**. The movement of prices signal to firms whether they should produce more or less of a good. High and low prices incentivize firms to either produce more or less.
- How to produce is decided by the **profit motive** of producers, choosing the least cost method.
- For whom to produce is answered by the price which performs the rationing function in the free market.

The **Command Economy** – one that relies totally on government direction and coordination.

The **Mixed Economy** – resources are allocated partly via the price mechanism and partly by the government. The economy is divided into the private and public sectors.

Unit 1.1: Competitive Markets—Demand and Supply

Markets – where buyers and sellers interact to carry out economic transactions.

Demand – the quantities of a product that consumers are willing and able to buy at various prices, *ceteris paribus*. There is an inverse relation between price and quantity demanded. It is determined by the following factors:

- **Price**
- **Non-price factors** such as:
    - **Changes in income**
    - **Changes in price of related goods**: substitutes and complements
    - **Changes in tastes**
    - **Legislation**
    - **Population size/demographics**

Supply – the quantities of a product that suppliers are willing and able to sell at various prices, *ceteris paribus*. There is a positive relation between price and quantity supplied. It is determined by the following factors:

- **Price**
- **Non-price factors** such as:
    - **Changes in cost of production**
    - **Changes in state of technology**
    - **Changes in number of sellers**
    - **Changes in price of related goods**: goods in competitive and joint supply
    - **Legislation**

Indirect taxation – taxes imposed on expenditure.

Specific tax – a tax that is levied as a fixed amount per unit sold irrespective of price. It causes a leftward and parallel shift of the supply curve.

Ad-valorem tax – a tax that is levied as a percentage of the selling price of the goods. It causes a leftward and pivotal shift of the supply curve.

Subsidy – a payment made by the government to producers to encourage the production of certain goods, but not in exchange for any goods or services. It is intended to decrease the marginal cost of production. It will shift the supply curve rightwards.

Market Equilibrium Price refers to the price where the quantity demanded (Qd) is equal to the quantity supplied (Qs). It is also known as a market-clearing price.

- Changes in demand: *ceteris paribus*, an increase in demand will increase the equilibrium price and a decrease in demand will decrease the equilibrium price.

- Changes in supply: *ceteris paribus*, an increase in supply will lower the equilibrium price and increase Qd. A decrease in supply will raise the equilibrium price and decrease Qd.
- Changes in both demand and supply will depend on the outcome of the graph.

Complementary goods refer to goods that are used jointly together to satisfy a want. Examples include washing machines and washing powder. The demand for a product will tend to vary inversely with the price of its complementary good.

Substitute goods refer to alternative products that satisfy the same wants or needs. Examples include beef and pork, or Coca-Cola and Pepsi. The demand for a product will tend to vary directly with the price of its substitutes.

Derived demand refers to the demand for a good that is derived from the need to produce other goods. Examples include the demand for steel due to the demand for cars and ships. An increase in the demand for cars and ships will lead to an increase in the demand for steel.

Joint supply refers to goods that are produced jointly with the same resources. Examples include beef and leather from cows. An increase in the demand for one of the product will result in a fall in the price of the other.

Competitive supply refers to goods that are produced with the same resources such that resources used for one good cannot be used to produce the other. Examples include wheat and maize. An increase in the demand for one of them will cause a rise in the price of the other.

Consumer surplus is the difference between what consumers are willing and able to pay for a unit of a good vs. what they actually pay.

Producer surplus is the difference between the revenue the producers receive from the sale of a unit of good vs. what they are willing to receive.

See the diagram below for an illustration of consumer and producer surplus.

Unit 1.2: Elasticity

Price Elasticity of Demand (PED) refers to the responsiveness of a quantity demanded of a commodity to changes in its price, *ceteris paribus*. It involves a movement along the demand curve in response to price changes. The formula for this is:

$$\text{PED of Good A} = \frac{\text{Percentage change in the Qd of Good A}}{\text{Percentage change in the price of Good A}}$$

The PED is usually negative, as there is an inverse relationship between the price and Qd of the good.

Magnitude of PED:

PED > 1 suggests that demand is **price elastic,** meaning that a given percentage change in price results in a larger percentage change in Qd, *ceteris paribus*.

PED < 1 suggests that demand is **price inelastic,** meaning that a given percentage change in price results in a smaller percentage change in Qd, *ceteris paribus*.

PED = 1 suggests that demand is **unitary price elastic** meaning that there is a proportionate change in Qd when given a percentage change in price, *ceteris paribus*.

PED = 0 suggests perfectly price inelastic demand. **PED = ∞** suggests perfectly price elastic demand. Both are reflected in the two diagrams below.

Relationship between PED and TR – when demand is price elastic, **lowering the price results in a rise in TR, while raising the price results in a fall in TR**. This is reflected below.

On the other hand, when demand is price inelastic, **lowering the price results in a fall in TR, while raising the price results in a rise in TR**. This is reflected below.

When demand is unitary price elastic, there is no effect on TR.

Determinants of PED

- **Availability of substitutes** – greater availability and closeness of substitutes results in a higher PED.
- **Nature of the good or service** – demand for food is relatively price inelastic because it is a necessity.
- **Degree of necessity** – the greater the necessity, the lower the PED.
- **Proportion of income spent on good** – the lower the proportion, the lower the PED.

Cross Elasticity of Demand (XED) refers to the responsiveness of a quantity demanded of a commodity to changes in the price of another, *ceteris paribus*. It involves a shift in the demand curve of Good A in response to price changes of Good B. The formula for this is:

$$\text{XED of Good A and B} = \frac{\text{Percentage change in the Qd of Good A}}{\text{Percentage change in the price of Good B}}$$

Magnitude of XED:

If **XED > 0** (positive), the goods are substitutes. An example is coffee and tea.

If **XED < 0** (negative), the goods are complements. An example is computer and computer software.

If XED is a **large positive value, the two goods are very close substitutes**. If XED is a **large negative value, the two goods are very close complements**. If XED is **0, the two goods are unrelated.**

Diagrams reflecting complement and substitute goods are below.

Determinants of XED

- **Degree of substitutability of complementarity**

Income Elasticity of Demand (YED) refers to the responsiveness of a quantity demanded of a commodity to changes in income, *ceteris paribus*. It involves a shift in the demand curve in response to income changes. The formula for this is:

$$\text{YED} = \frac{\text{Percentage change in the Qd of Good A}}{\text{Percentage change in income}}$$

Magnitude of YED:

If **YED > 0** (positive), this suggests that the good is a normal good and income inelastic.

If **YED > 1** (greater than one), this suggests that the good is income elastic and are generally luxuries.

If **YED < 0** (negative), this suggests that the good is an inferior good.

Determinants of YED

- **Nature of goods**
- **Level of household income**

Price Elasticity of Supply (PES) refers to the responsiveness of a quantity supplied of a commodity to changes in its own price, *ceteris paribus*. It involves a shift along the supply curve in response to price changes. The formula for this is:

$$\text{PES} = \frac{\text{Percentage change in the Qs of Good A}}{\text{Percentage change in price of Good A}}$$

Magnitude of PES:

If **PES = 0,** the Qs remains constant despite any changes.

If **PES is between 0 and 1,** a change in price leads to a less than proportionate change in quantity supplied.

If **PES = 1,** a change in price leads to a proportionate change in quantity supplied.

If **PES is between 1 and infinity**, a change in price leads to a more than proportionate change in quantity supplied.

If **PES = ∞,** any amount will be supplied at a certain price but none lower. See diagram below for representation.

Determinants of PES

- **Existence of spare productive capacity**
- **Availability of stocks**
- **Factor mobility**
- **Barriers to entry**

Applications of Elasticity Concepts

PED in maximizing total revenue

- Where demand for the product is price elastic, the price can be lowered to increase TR.
- Where demand is price inelastic, the price can be raised to increase TR. Diagrams are reflected earlier in the notes.

XED in maximizing total revenue

- Where XED is positive and high, one has to monitor the situation of their competitors and react to their circumstances.
- Where it is negative and high, one is able to plan by monitoring the situation of the complement goods.

YED in maximizing total revenue

- Primary Producers: raw materials such as rice has low YED, thus there is no need to produce more in reaction to higher incomes.
- Secondary Producers: more income elastic, higher incomes will mean higher demand.
- Tertiary Producers: very income elastic.

Unit 1.3: Government Intervention

Taxation – defined earlier

Taxation to raise revenue: the government will wish to maximize the tax yield. Governments will have to consider demand and supply. **The tax yield is greater, *ceteris paribus*, when demand is relatively price inelastic.** This is reflected in the diagrams below.

Taxation to discourage consumption of a good is more effective when demand is price elastic as in response to the higher price, the quantity demanded drops by a larger proportion. This is reflected in the diagrams below.

Subsidies to encourage consumption of a good are more effective when demand is relatively price elastic. This is reflected in the diagrams below.

Incidence of Taxation refers to the distribution of the burden of taxation; falling on the producer or consumer. This depends on the relative price elasticity of demand and supply of the good.

Case A: Demand is price elastic relative to supply – burden falls on the producer

Case B: Demand is price inelastic relative to supply – burden falls on the consumer

Case C: Supply is price elastic relative to demand – burden falls on the consumer

Case D: Supply is price inelastic relative to demand – burden falls on the producer

Distribution of subsidies between producers and consumers is similarly affected by differing price elasticity in demand and supply.

Case A: Demand is price inelastic relative to supply – consumers benefit more

Case B: Demand is price elastic relative to supply – producers benefit more

Price controls refer to the setting of minimum of maximum prices by the government (or private organizations) such that prices are unable to adjust to their equilibrium level. This results in market disequilibrium and shortages and surpluses.

Price ceiling – legal maximum price that is set below the market equilibrium price. It is usually to allow low-income households to afford essential goods and services, achieving fairer distribution. An example is illustrated in the diagram below. Other examples include rent and food price controls.

Consequences for the Economy and Stakeholders

- **Shortages**
- **Non-price rationing**
- **Parallel/underground markets**
- **Under-allocation of resources and allocative inefficiency**
- **Negative welfare impacts**

- **Consequences for related markets**

Price floor – legal minimum price that is set above the market equilibrium price. It is usually to transfer income from consumers to producers**,** increasing producer income. An example is agricultural price support. Another example is the minimum wage to ensure the welfare of low-wage workers. An example is illustrated in the diagram below.

Consequences for the Economy and Stakeholders

- **Surpluses leading to waste and price depression through dumping**
- **Firm inefficiency**
- **Overallocation of resources to production and allocative inefficiency**
- **Negative welfare impact**

Minimum wage serves to guarantee an adequate income to low-wage workers. This is reflected in the diagram below.

Consequences for the Economy and Stakeholders

- **Labor surpluses and unemployment**
- **Illegal workers at wages below minimum**
- **Misallocation of labor resources**
- **Misallocation in product markets**
- **Negative welfare impacts**

Unit 1.4: Market Failure

Market Failure is defined as the failure of the market to achieve efficiency in the allocation of society's resources, resulting in an over-allocation of resources or an under-allocation of resources in the absence of government intervention.

Social efficiency is achieved where the marginal benefit to society (MSB) is equal to the marginal cost to society (MSC). There must be perfect competition and no externalities. Reductive examples of welfare loss due to over or underproduction are reflected in the diagram below.

Externalities are additional costs or benefits to society, over and above those experienced by the individual producer or consumer.

Cost and Benefit Concepts

Marginal Private Cost and Marginal Private Benefit refers to the cost and benefit to consumers and producers respectively of the consumption or production of an extra unit of good.

Marginal External Cost and Marginal External Benefit refers to the third party spillover effects of production or consumption that are experience by those other than producer or consumer. They create a divergence between private and social costs or benefits.

External Benefit or Positive Externalities refer to benefits from production or consumption experienced by people other than the producer or consumer.

External Costs or Negative Externalities refer to costs borne by third parties who are not involved in the consumption or production activity and are not compensated for.

Marginal Social Cost and Marginal Social Benefit refers to the full/true benefit or cost to society of an extra unit of good consumed or produced. It is the sum of private and external cost and benefits.

Source of Market Failure

- **Externalities**
- **Missing market for public goods**
- **Common access resources**
- **Asymmetric information**
- **Monopoly power** (market structure)

Case 1: Negative externalities arising from production and government measures (taxes/tradable permits vs. legislation) – example of a power plant using coal to generate electricity

Solution	Evaluation
Taxation – to internalize the external cost of production. When the tax is equal to MEC, the MPC curve will be shifted to MSC and attain a new socially efficient equilibrium.	It forces the firm to take into account the full social costs and incentivizes production of cleaner technology. The tax is variable and allows the tax on other areas to be eased. However, there is difficulty measuring the true amount required to tax and may harm international competitiveness.
Tradable Pollution Permits – setting a limit on the amount of pollution those firms can discharge. Cleaner firms can sell off their remaining pollution credits and those who pollute more have to buy. Incentivizes reduction of emissions.	Incentivizes cutting back on emissions and is a relatively low-cost procedure. Setting a limit or cap on the actual amount may yield better results. It also encourages firms to reduce emissions further to sell off any remaining pollution permits.

	However, it can be administratively costly and will not lead to efficiency unless the efficient level of total emissions is known. Firms with greater financial muscle may see no point in cutting back and the market could under-estimate the cost of pollution, underpricing the permits. Technical information is also limited and political favoritism is a threat.
Legislation – controlling business activities through licenses, setting standards, laws and rules. Requires firms to install equipment and comply with tests.	Simpler and easier to operate than taxes. Penalties and regular inspections will ensure better results in cracking down on producers. However, it creates no market-based incentives and makes no distinction between firms that are cleaner and those that are not. There may be problems of enforcement. Lack of technical information may be a hindrance.

Case 2: Positive externalities arising from production (subsidies vs. provision) – example of training for workers

Solution	Evaluation
Subsidies – can be granted to firms that offer training, internalizing such external benefits.	Subsidizing good practices incentivizes firms to adopt more good practices. It also incentivizes firms to send workers for training, raising overall labor productivity and increases income levels for workers. However, it is difficult for the

	government to estimate the level of subsidy deserved. The cost of the subsidies may also imply an opportunity cost, causing the government to cut back spending on other areas.
Direct Provision – to provide vocational training courtesy of the state by setting up training centers.	Helps to create jobs and generates temporary income. However, the costs incurred are a limitation, as is the quality of the expertise sources and the difficulties in diagnosing the needs of the labor market. There is also time lag in the implementation of the process.

Case 3: Negative externalities arising from consumption (taxes vs. legislation and information provision) – example of alcohol abuse

Solution	Evaluation
Taxation – shifting the MPC curve to the left, reducing market output to the socially optimal output and correcting the over-allocation of resources.	Allows the government to raise revenue and use it to compensate affected parties, although there is difficulty measuring the external cost and may even encourage smuggling. Taxation might not work as demand for such goods may be price inelastic and any tax would hurt the lower-income groups more.
Legislation – enacting laws prohibiting the production or sale of alcohol, reducing demand and shifting MPB to MSB.	Simple and straightforward policy, although enforcement and penalties must be up to the task.
Information Provision – education by	This is a long run policy that will change

the government to discourage the consumption of alcohol, shifting MPB to MSB.	consumption habits, though the cost of such policies will be high. It is also a long and costly process to take with no guaranteed outcome.

Case 4: Positive externalities arising from consumption (subsidies vs. legislation and direct provision) – example of vaccinations

Solution	Evaluation
Subsidies – granted to the forms providing the vaccines, shifting MPC to MPC-subsidy, attaining a socially efficient equilibrium.	It still permits markets to operate and ensures firms pass on the benefits to consumers and can be adjusted in response to the magnitude of the problem. However, success depends on the accuracy of measuring the exact value of external benefits. It is also costly and may result in the imposition of more taxes on the people.
Legislation – promoting greater consumption of vaccines, such as mandating vaccination at birth.	Straightforward and simple policy but requires proper enforcement and resources to regulate.
Direct Provision – the government identifies the shortfall and provides for it. The government could also take over the provision of such goods.	The quality and quantity is decided by the government; most likely to be socially optimal. However, it is difficult to gather enough information to estimate the right amount. May also require high taxes and denies choice of services from the private sector.

Merit goods – goods or services that have been deemed socially desirable by the government to society.

Demerit goods – goods or services that have been deemed socially undesirable by the government to society.

Public goods – goods that would not be provided at all in the free market. Is characterized by its non-excludability and non-rivalry. Governments usually directly provide such goods.

Common access resources – typically natural resources such as fishing grounds, forests etc. They are resources for anyone who has free access and has rivalry in consumption. They are in danger of over-consumption and threaten sustainability. It may also result in environmental problems and **reduction of resources, suggesting a fall in the PPC**. Government responses include pollution taxes, cap and trade systems, legislation and use of renewable energy.

Asymmetric information – one party in an economic transaction has access to more information or better information than the other party.

Adverse selection – products of different qualities are sold at a single price because buyers and sellers are not sufficiently informed.