**Chapter 2.4 Elasticities of Demand and Supply**

**Price Elasticity of Demand (PED)**

**2.4.1A Definition and Formula**

* Price elasticity of demand measures the responsiveness of change in quantity demanded as a result of change in its price
* $PED=\frac{Percentage change in quantity demanded of good concerned}{Percentage change in the price of good concerned}$

**2.4.1B Interpreting the Values**

PED = 0

* Perfectly price inelastic – when demand curve is vertical
* There is no change in the quantity demanded in response to the change in the price of good concerned

PED < 1

* Price inelastic – Steep demand curve
* The proportional change in quantity demanded is less than the proportional change in the price of the good concerned

### PED = 1

* Unitary price elasticity – Demand curve is a rectangular hyperbola
* The proportional change in quantity demanded is equal to the proportional change in price of the good concerned

### PED > 1 and PED < $\infty $

* Price elastic – Gentle demand curve.
* The proportional change in quantity demanded is greater than the proportional change in the price of the good concerned

### PED = $\infty $

* Price perfectly elastic – Horizontal demand curve.
* The proportional change in quantity demanded is infinite when there is a change in the price of the good concerned.

**2.4.1C Determinants of PED**

* Degree of necessity
* Availability of substitutes
* Proportion of income spent on the good
* Time period for consideration of purchase
* Number of possible uses of the good

**2.4.1D Uses of PED**

a) To Help to Derive the Price Strategy – To Increase Total Revenue

* + - When the demand is **price-elastic**, a decrease in the price of the good will lead to an increase in the total revenue as the gain in revenue due to the increase in quantity demanded is greater than the loss in revenue due to a reduction in the price of the good concerned.
		- When the demand is **price-inelastic**, an increase in price of the goods will lead to an increase in the total revenue as the gain in revenue due to an increase in price of the good concerned is greater than the loss in revenue due to a reduction in the quantity demanded.

**When PED is elastic (lower price)**

Gain in Revenue due to ↓P (P0 to P1) > Loss in Revenue due to ↑QtyDD (Q0 to Q­1)

**When PED is inelastic (raise price)**

Gain in Revenue due to ↑P (P0 to P1) > Loss in Revenue due to ↓ QtyDD (Q0 to Q­1)

P

P

Qty

Qty

P1

P0

P0

P1

Q1

Q1

Q0

Q0

D

D

b) Conduct Price Discrimination

* Refers to setting two different price levels for the same product
* E.g. MacDonald’s student meal, student price for bus trips
* Firms have to identify markets with the more price-inelastic demand and more price-elastic demand, so as to conduct price discrimination that would maximise total revenue
* Bus/train rides for students (price-elastic) and adults (price-inelastic)

**Income Elasticity of Demand (YED)**

**2.4.2A Definition and Formula**

* Income elasticity of demand measures the responsiveness of change in quantity demanded due to a change in the income of the consumer
* $YED=\frac{Percentage change in quantity demanded of good concerned}{Percentage change in the level of consumer income}$

**2.4.2B Interpreting the Values**

* Normal goods have a positive income elasticity of demand (YED>0)
* As consumers’ income rises, more normal goods are demanded
* E.g. basic necessities
* **Luxury goods** have an income elasticity of demand **> +1 (YED>1)**
* **The increase in demand for luxury goods is more than proportionate to the increase in consumers’ income**
* **E.g. sports cars, luxury holiday trips**
* **Inferior goods have a negative income elasticity of demand (YED<0)**
* **As consumers’ income rises, less inferior goods are demanded**
* **Low quality food**

**2.4.2C Determinants of YED**

* Proportion of income spent on the good
* Small proportion – value of YED<0 – consumer price-insensitive – inferior good
* Large proportion – value of YED>0 – consumer price-sensitive – normal or luxury food
* Price of the good and level of consumer income

**2.4.2D Uses of YED**

a) Provide information on how firms should produce based on economic outlook

Based on the current economic situation, firms will decide what type of goods to produce:

* Poor economic outlook (e.g. recession)
* Lower disposable income 🡪↑dd for inferior good; ↓dd for normal good
* Favourable economic condition (positive growth)
* Higher disposable income 🡪↑dd for normal good; ↓dd for inferior good

b) Provide information on how firms determine price strategy based on price sensitivity

Based on the current economic situation, firms will use the YED information to derive the appropriate price strategy to maximise profits

* Lower price sensitivity
* E.g. introduce instalment payment plans (Home appliances, furniture, holiday tour packages)

**Cross Elasticity of Demand (CED)**

**2.4.3 Definition and Formula**

* Cross elasticity of demand measures the responsiveness of change in quantity demanded as a result of change of price of other good.
* $CED=\frac{Percentage change in quantity demanded of good concerned}{Percentage change in the price of another good}$

**2.4.3B Interpreting the Values**

* If goods are complementary (e.g. Ipod and Earphones), CED is negative (CED<0)
* If goods are substitutes (e.g. Coke and Pepsi), CED is positive (CED>0)

**2.4.3C Determinants of CED**

* Relationship of the goods
* The nature of usage of the goods and relation to each other will affect the relationship of the goods
* Complementary goods; substitutes
* Market classification
* The broader the market classification, the more elastic the value of the CED

**2.4.3D Uses of CED**

a) Determine the relationship of goods

Based on the CED information, firms can devise a suitable marketing strategy

* Complementary goods
* Conduct bundle sales
* E.g. Breakfast set (Coffee, eggs and bread)
* E.g. ‘Back to school’ deals – School backpack and stationary set
* Substitutes
* Cultivate brand loyalty
* E.g. Apple iPhone versus Samsung Galaxy
* Conduct product differentiation
* E.g. iMac Operating System vs Windows

b) Determine the degree of competition and develop nature of competition

Based on the CED information, firms can measure the degree of competition and assess whether to conduct price strategy in the short run or cultivate brand loyalty in the long run, so as to maximise total revenue

* Short run – Conduct extensive reduction
* Lower price to raise competitiveness
* But not feasible in the long run due to market saturation and profit reduction
* Long run – Cultivate brand loyalty
* Through product differentiation
* Make product more price-inelastic, allowing the firm to raise price and avoid price competition

**Price Elasticity of Supply (PES)**

**2.4.4A Definition and Formula**

* + - Price elasticity of supply measures the responsiveness of the change in quantity supplied due to a change in the price of the good concerned.
		- $PES=\frac{Percentage change in quantity supplied}{Percentage change in the price of good concerned}$

**2.4.4B Interpreting the Values**

PES = 0

* Perfectly price inelastic – when supply curve is vertical
* There is no change in the quantity supplied in response to the change in the price of good concerned

PES < 1

* Price inelastic – Steep supply curve
* The proportional change in quantity supplied is less than the proportional change in the price of the good concerned

### PES = 1

* Unitary price elasticity – Supply curve is a rectangular hyperbola
* The proportional change in quantity supplied is equal to the proportional change in price of the good concerned

### PES > 1 and PES < $\infty $

* Price elastic – Gentle supply curve.
* The proportional change in quantity supplied is greater than the proportional change in the price of the good concerned

### PES = $\infty $

* Price perfectly elastic – Horizontal supply curve.
* The proportional change in quantity supplied is infinite when there is a change in the price of the good concerned.

**2.4.4C Determinants of PES**

* Capacity of production
* The more limited the capacity of production, the more price-inelastic the supply
* E.g. Agricultural production, like rice, yielded from fixed land capacity
* Perishables (e.g. fruits and vegetables) tend to be more price-inelastic
* Time period for production capacity
* The longer the time period for production, the more price-inelastic the supply
* E.g. Agricultural products – long gestation period
* E.g. Oil production
* Cost of resources
* The higher the cost of resources, the more price-inelastic the supply
* Affects cost of production
* Difficult to raise production capacity
* Number of firms in industry
* The greater the number of firms, the more price-elastic the supply
* Production capacity can be easily increased when there is an increase in the price of the good concerned

**2.4.4D Uses of PES**

* It depicts the extent of change in quantity demanded and change in price of the good itself when there is a change in demand for the good. When there is an increase in demand for the good, the rise in price will be sharp and the reduction in quantity will be less than proportional than the rise in price if the supply is price-inelastic
* This will explain why the supply of agricultural production is price-inelastic as the production capacity is limited by limited resource capacity as there is limited yield from limited land space

### **2.5.1 Consumer and Producer Surplus**

* + - Consumer surplus is the difference between the maximum amount that consumers are willing to pay for a given quantity of good and what they actually pay (equilibrium price).
		- Producer surplus is the difference between the amount received by producers and the minimum amount that they are willing and able to accept for supplying the good.