# Notes 2012 Topic 7B: Elasticity of Demand and Supply

## Meaning of concepts

### Elasticity of Demand

* + - Elasticity of demand measures the responsiveness of change in quantity demanded as a result of change in the variables influencing it.
		- The changes in the variables are the change in the price of the goods itself, price of other goods and income of the consumers.

### **Price Elasticity of Demand (PED)**

* + - Price elasticity of demand measures the responsiveness of change in quantity demanded as a result of change in its price.
		- It is **NOT** equivalent to the slope of the demand curve.
		- Formula



### **Cross Elasticity of Demand (CED)**

* + - Cross elasticity of demand measures the responsiveness of change in quantity demanded as a result of change of price of other good.
		- Formula



### **Income Elasticity of Demand (YED)**

* + - Income elasticity of demand measures the responsiveness of change in quantity demanded due to a change in the income of the consumer.
		- Formula



### **Price Elasticity of Supply (PES)**

* + - Price elasticity of supply measures the responsiveness of the change in quantity supplied due to a change in the price of the good concerned.
		- Formula



## Concepts of Price elasticity of Demand - Explanation or Distinguish

1. Definition
2. Formula
3. Magnitude/Co-efficient
4. Determinants
5. Uses/Implications

### 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 demand 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 demand is equal to the proportional change in price of the good concerned.

### PED > 1 and PED < ∞

* + - 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 = ∞

* + - 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.

### When PED is negative, the good is either normal or inferior.

### When PED is positive, the good is a giffen good.

## Determinants of Price Elasticity of Demand

### Degree of Necessity

* + - When the degree of necessity of demand for a good is high, consumers will have a less than proportionate decrease in quantity demanded when there is an increase in the price level of the good concerned as the good and does not mind the higher price level.
		- The degree of necessity is influenced by the habitual and staple nature of consumption (e.g. rice; Oil-essential resources 🡪High degree of necessity of demand)

### Availability of Substitutes

* + - Price and cross elasticity of demand will be price-inelastic if there are less close substitutes available.
		- This depends on the classification of the goods based on and how broadly the good is categorized in relative to other goods. The broader the market is classified, the more choices are available to the consumer and the more price elastic the demand will be when there is a change in price level.
		- The degree of availability of substitutes is also influenced by the degree of market competition; which is indirectly affected by the market demand and the number of firms in the industry. When the market competition is high as the market demand is low, the consumers will have more choices, making the demand more price-elastic.

### Proportion of Income Spent on the Good

* + - If the good takes up only a small proportion of the consumer’s income, the price elasticity of demand is price-inelastic as the consumer is not that price sensitive since their purchasing power is not compromised extensively. (Air passengers 🡪Ped elastic🡪Large🡪Average income earners)

### Time Period for Consideration of Purchase

* + - The longer the time period available for the consumer to consider their purchase, the demand will be more price-elastic as the consumers have time to look for alternatives and to consider other substitutes.

### The Number of Possible Substitutes’ Uses

* + - When a good can be used in many ways, the quantity demand for it will be elastic as the price reduction will be demanded by many users.
		- Even if the one group of consumers do not increase their quantity demanded as price decreases, other groups of consumers will increase their quantity demanded contributing to large change in quantity demanded of the good, influencing the demand to be elastic.

**Qn: What will happen to the TR if PED is unitary and perfect when there is an increase in income?**

## Explain why the price elasticity of demand for 7-11 goods is price-inelastic.

* + - PED for 7-11 good are price inelastic for the following reasons:
* Most 7-11 goods are necessities like toothpaste, food, etc and they have a high degree of necessity which is influenced by the need for use and it is also habitual in nature of consumption like cigarettes.
* Since 7-11 is opened for 24 hours, there is no close substitute for a convenience store where the consumer can make purchase in 7-11 round the clock. 7-11 stores can also conduct product differentiation by distinctive renovation of the shop and strategic location of stores that make it very convenient for the consumers that it is a logical choice for them to purchase at 7-11 stores. Hence the lack of close substitute makes PED for 7-11 goods price inelastic.
* Good sold in 7-11 are usually goods that are for daily use and they do not take up a large portion of the consumers’ income. Consumers are not price sensitive and the value PED is small.
* The time available for a consumer to consider buying a 7-11 good is short. For example, late night hunger pangs induce consumers to look for ‘fast food’ from 7-11. As the time for consideration is short, price elasticity is low for the goods.
1. Degree of necessity of demand – High/Low
2. Availability of substitutes – More/Less
3. time period for consideration of purchase – Short/Long
4. Proportion of income spend on the good – Small/Large

## Uses of Price Elasticity of Demand

### 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.

Diagram 1

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

Diagram 2

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

P

P

Qty x

Qty x

P1

P0

P0

P1

Q1

Q1

Q0

Q0

D

D

### The Need to Conduct Price Discrimination

* + - Refers to the setting of 2 different price levels for the same product

*✓E.g. Cathay movie discounts for students; MacDonald’s student meal*

* + - In order to conduct price discrimination, firms must be able identify the more price-inelastic demand so as to increase the revenue by selling at higher price level for the market with the price-inelastic demand and selling at a lower price level for the market with the price-elastic demand.

*✓Ped-elastic 🡪↓P (Economy Class for air travel)*

*✓Ped-inelastic🡪↑P (1st Class for air travel)*

### Provide Information on the Tax Policy is to be Conducted – Help Government to Set Tax Revenue

* + - The government will impose indirect tax on goods with price-inelastic demand as the **reduction in quantity demand is low** even if price is increases. As a result, the **tax revenue will be higher**, since the **number of taxable units remains high**.
		- The degree of the price elasticity of demand and price elasticity of supply will determine whether the tax burden falls on the consumer or the producer, thus increasing the cost of living or cost of production. [CTB🡪↑COL, PTB🡪↑COP]
		- The consumer tax burden will be higher when the demand is price-inelastic or when the supply is price-elastic

### Provide Information of Price Regulation should be Conducted

* + - The degree of the price elasticity of demand and supply will determine the manner on how the government will conduct the subsidy when it conducts floor price or imposes maximum price level.
		- When the demand and supply are price-inelastic, the government will impose floor price and create a stock-pile so as to maintain the revenue for the primary producers , while maintaining stock-pile is a low cost government expenditure

### Provide Information on the Effect of Tariff and Impact of Change in Exchange Rate on the Economy

* + - The value of price elasticity of demand for imports and exports will affect how the level of tax revenue collected from the imposition of tariff and the effectiveness of the trade policies in controlling import expenditure (Pedm is price-inelastic🡪↑tax rate)
		- It will also affect the impact of change in exchange rate on the balance of trade. For example a depreciation will not contribute an improvement in balance of trade if the Marshall-Lerner condition is not satisfied (Pedx and Pedm is less than one 🡪Depreciation 🡪BOT worsen in SR – the J curve effect🡪SR

### Effectiveness of Labour Unions

* + - If a labour intensive product is price inelastic, the labour unions are more likely to succeed in asking for a wage increase.
		- Increase in wage 🡺 increase in COP 🡺 increase in price of product 🡺 revenue will not drop as much since product is price inelastic.

## Determinants of Cross Elasticity of Demand

### Relationship of the Goods

* + - The **nature** **of usage of the goods** and relation to each other will **affect the relationship of the goods.**
		- If goods are **complementary** (e.g. Ipod and Beats™ headsets), **XED is negative.**
		- If goods are **substitutes** (e.g. Asics and Nike shoes), **XED is positive.**

### Market Classification

* + - **Market classification** affects the nature of usage of the goods n relation to each other will affect the relationship of the goods.
		- The **broader the market classification, the more elastic, the value the cross elasticity of demand.**

## Uses of Cross Elasticity of Demand

### To Determine the Relationship of Goods

* + - To assess whether the goods are **complementary or substitute** in nature and in using these information to **devise a suitable marketing strategy.**
		- Firms can **adjust their outputs** when faced with a change in rival’s pricing. Same applies for pricing in tandem with complementary product
		- Complementary 🡪 Bundle sales (e.g. Bread and Kaya)

### To Help to Determine the Degree of Competition and Develop Nature of Competition

* + - By **measuring** the **degree of competition** in the industry and **assess whether to** **conduct price strategy or not** (the other choice would be to conduct product differentiation through advertising).
		- In short run, the firm will conduct **extensive price reduction** to raise competitiveness in the market but may conduct product differentiation and promotion in the **long run** to cultivate brand loyalty. This will make the product more price inelastic, allowing the firm to raise price and avoid price competition which is not feasible in long run due to market saturation and profit reduction.
		- *Substitutes: SR – always engage in price competition for substitutes*
		- *LR - ↑COP 🡪 More competition 🡪 Cannot ↓P ∴Need to conduct product differentiation🡪Ped-inelastic🡪↑P🡪↑TR*

## Determinants of Income Elasticity of Demand

*(Value is distorted by social background)*

### The Proportion of Income Spent on the Good

* + - If the proportion of income spent on the good is small, the value of income elasticity of demand will be negative as it is an inferior good implying that the consumer is price insensitive. (Yed is price-inelastic🡪↑P)
		- If the proportion of income spent on the good is large, the value of Yed will be positive as it is a normal or luxury, good implying that the consumer is price sensitive (Yed-elastic🡪↓P)

### The Price of the Good and the Level of Consumer Income

* + - The proportion of income spent on the good depends on the price level of the good and the level of the consumer income – average income earners.

## Uses of Income Elasticity of Demand

### Provide information on how the firm can respond in relation to the change in economic growth of the country.

🞹 This will help the firm to understand the types of goods the consumer will want to buy under the current economic condition so that it will improve the efficiency of stock management.

* Recession - ↓Yd🡪↓dd for normal good/↑dd for inferior good
	+ - E.g. In good times, firms should increase production of normal goods with positive YED as consumers are willing to spend on goods which occupies large proportion of income.

### Provide information about the consumer’s degree of price sensitivity and thus help to determine the price strategy.

* + - As income changes with economic climate, firms can use the information from YED to derive the appropriate price strategy to maximise profits. For example, the firm can **introduce instalment** **payment plan** *(e.g. Holiday packages/electrical products)* to reduce the portion of income spent on the good so as to **reduce its price sensitivity.**

**Qn: Why firms cannot ↓P in LR?**

-COP ↑ as more units are produced

-↑Qtydd – may reach saturation of market

## Price Elasticity of Supply

### 10.1 Determinants of Price Elasticity of Supply

* Price elasticity of Supply measures the responsiveness of change in quantity supplied in response to the change in price of the good itself
* Formula= Change in quantity supplied

 Change in the price of good itself

### 10.1.1 Capacity of Production/ Stock of Products

* + - The more limited the capacity of production *(e.g. agricultural product – yield from fixed land capacity),* the more price-inelastic the supply as limited production capacity means that the production capacity cannot be increased easily to accommodate the increase supply despite an increase in the price level.
		- If products are non-perishables with low storage cost, supply tend to be more price elastic.

### 10.1.2 Time Period for Production Capacity

* The longer the time period for production, the more price-inelastic the supply as the industry has a **limited capacity of production** and cannot easily increase production extensively despite an increase in the price level.
* E.g. Agricultural products – Long gestation period 🡪cannot ↑SS extensively in SR🡪 PES inelastic

### 10.1.3 Cost of Resources

* + - If the unit cost of resources is high, the cost of production is high and the industry may find it hard to increase the production capacity. Consequently a larger percentage increase in price of the good is needed to increase a certain percentage increase in the quantity supplied, contributing to a price-inelastic supply.

### 10.1.4 Number of Firms in Industry

* + - The greater number of firms, the more price elastic as the production capacity can be easily increased where there is an increase in the price of good concerned.

10.2 Uses of Price Elasticity of Supply

* 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**

S1

P

P2

S2

P1

D2

P0

D1

Qty

Q1

Q2

Q0

↑in dd 🡪↑P🡪△Qty depends on PES

S1 – Price-inelastic 🡪 ↑P extensively

S­1 – Price-elastic 🡪 ↑P less extensively

🞹10.3 Limitations of Price-Elasticity of Demand and Supply

* Used to explain why concepts of elasticity are irrelevant
* Magnitude of the value of PED and PES will vary as time span is longer
* Ceteris paribus condition is not possible in reality, and thus, the complexity of the economic environment will affect the value PED and PES simultaneously
* Social variables will distort the implication of the value of PED as the consumer with similar proportion of income spent on a good will have different response to change in quantity demanded because of their family background
* Concepts of elasticity cannot account for social variables which will distort the value (e.g. marriage status will distort price sensitivity), as concept of elasticity of dd/ss is a general concept

## Uses of Price Elasticity of Supply

### Taxation

* + - Applies to situations when PES = 0, taxation falls entirely on producers, reducing after tax income.
		- PES = ∞, where tax burden falls entirely on consumer, reducing welfare.

## 12. The Application of the Concepts of Elasticity of Demand and Supply

### How to use the concepts to increase revenue

* + - If PED is low (inelastic), firms can increase revenue by increasing price.
		- If PED is high (elastic), firms can increase revenue by reducing price.
		- In good times, firms must increase the production of normal goods that have positive YED as increase in income during good times cause increase in quantity demanded.
		- In bad times, firms increase the production of inferior goods that have negative YED as decrease in income during bad times cause increase in quantity of inferior goods demand.
		- As price is reduced, movement along the demand curve leads in increase in price elasticity.

A PED>1

Price

* + - As price decreases from A to B, P/Q ratio decreases, hence price elasticity drops.
		- At point B, PED = 1.
		- Movement from B to C further decreases PED.
		- Hence a reduction of price leads to an increase in revenue.

B PED=1

C PED<1

Quantity

The concept can be used to conduct price discrimination to enable the producers to separate the market and raise the total revenue

* ↓P🡪↑TR from A to B🡪Ped elastic
* ↓P🡪↓TR from B to C🡪Ped inelastic

⇨justify that producers cannot ↓P continuously as TR↓🡪COP will ↑🡪∏ ↓

As Qty↑,↓P 🡪Ped becomes smaller🡪↓P🡪TR↑ and then ↓

TR

Ped >1

Ped <1

Ped = 1

Qty

P

### How It will Affect the Market Equilibrium

* + - It explains why the price level will rise and fall sharply when there is a change in the demand and supply.

(When both the demand and supply are price-inelastic, the price level will rise or fall greatly when there is either a change in demand or supply as the change in quantity demanded and supplied is unable to induce a more than proportional change in the quantity demanded and supplied due to the factors that limit the response, especially in the short run.)

* + - It will also help to explain why the change in the quantity is greater if the demand and supply is price elastic as the consumers are able to respond to the change in the price level, as the consumers and producers can adjust their more responsive, with given conditions that influence them to do so.
		- It helps to determine the consumer and producer tax burden which will determine the cost of production and cost of living.

(If the demand is price elastic and the supply is price inelastic, the imposition of specific indirect tax will raise the tax burden for the producers and lower tax burden for the consumers and this will raise cost of production but lower cost of living for the consumers.

* + - It will determine the level of consumer surplus, producer surplus and dead-weight loss.
		- △ in DD/SS 🡪△ in price/qty
* value of PED/PES affect the extent of △ in price/qty
* Tax imposition 🡪 affect CTB/PTB, tax incidence and DWL

### **🞹 How It Helps the Government**

12.3.1 Impact on tax imposition of specific tax

* + - It helps the government determine the effects of taxation on certain goods.
		- If goods have high PED and low PES, the tax incidence falls more on producers
		- If good to be taxed is low in PED and high in PES, the tax incidence is skewed towards the consumers and this will affect the consumer tax burden.
		- Understanding the effects that allow the government foresee economic effects on the country as tax are imposed.

12.3.2 Use of concept of elasticity of PED to correct negative externalities

* If the demand is price-inelastic, the imposition of the indirect tax may not be able to gain the intended aim to reduce consumption and thus, the government may need to adopt other more direct form of intervention.
* ↓Qtydd by 10 units , PED is price-inelastic🡪↑tax🡪↓Qty­dd by 5 units 🡪Quotas will be preferred

12.3.3 Use of concept of elasticity of PED to explain how trade and exchange rate management of policy will affect the balance of trade

* If the price elasticity of export demand and supply are both inelastic in the short run, the import expenditure will rise and export revenue will fall when there is rise in price of import and fall in price of export due to depreciation. Other the other hand, if the price elasticity of export demand and supply are both elastic in the long run, the import expenditure will fall and export revenue will rise when there is rise in price of import and fall in price of export due to depreciation.

12.3.4 Use of the concepts of PED and PES to determine the method of government expenditure to stabilize the market after the imposition of floor price so as to reduce government expenditure

* When the demand and supply are price-inelastic and the good is non-perishable, it will be advisable for the government to buy over the excess stock to create a buffet stock to enable the government to use it as way to influence the supply of the industry. This method will also cost less in term of government expenditure as compared to subsidy at market-clearing price.
* When the demand and supply are price-elastic and the good is perishable, it will be advisable for the government to clear up the excess stock by subsidizing the consumer at the market clearing-price by paying the difference between the floor price and the market-clearing price level. This method will also cost less in term of government expenditure as compared to a buffer stock and allow the producers to sell all the quantity.

Correction of inequality of distribution of income and wealth 🡪CTB

1. **Areas of Discussion**

13.1 Analysis of the influence of concept of elasticity of demand and supply on the impact of the market equilibrium as a result of change in demand and supply

**Type I**

13.2 Explain the concepts of PED, XED, YED, and PES

* Definitions
* Co-efficient
* Magnitude
* Determinants of concept
* Uses of the concepts

Limitations of Price-elasticity of Demand and Supply

* Magnitude of the value of PED and PES will vary as time span is longer
* Ceteris paribus condition is not possible in reality, and thus, the complexity of the economic environment will affect the value of PED and PES simultaneously
* Social variables will distort the complications of the value of Ped as the consumer with similar proportion of income spent on a good will have different response to change in quantity demanded because of their family background

**Type II**

13.3 Distinguish the concepts of PED, XED, YED and PES

* Comparisons should be based on variables influencing the concepts
* Definitions
* The interpretation of the co-efficient
* How the magnitude will vary for different concepts
* Identify the different determinants
* how he uses will differ

13.4 Explain how the produces uses the concept to raise total revenue

1. **PED**
2. conduct price strategy 🡪 aim to ↑ total revenue

🡪Ped elastic🡪↓P🡪↑TR

🡪Ped inelastic 🡪 ↑P🡪↑TR

1. Conduct price discrimination 🡪 setting 2 different prices for the same product
2. **XED** – Understanding of the goods
3. Complement 🡪 Bundle sales
4. Substitutes

🡪 SR 🡪 Price reduction

🡪LR 🡪 Product differentiation (avoid price competition) 🡪 make demand Ped-inelastic 🡪 ↑P🡪↑TR

1. **YED**
2. Stock management – Need to know types of good to sell under different economic condition
3. Classification of goods – normal / inferior 🡪 price-sensitivity 🡪 develop price strategy

13.5 Explain how the producers will shut down production when the cost of production increases due to factors like an increase in price of oil

-Using the concept of elasticity of demand and supply

↑Oil price 🡪↑COP 🡪 need to ↑P to cover ↑COP but if demand is price-elastic🡪↑P🡪↓TR🡪make losses

∴The firm may cease production of goods with price-elastic demands (e.g. the economy for direct flight for long haul)

14.1. Explain and evaluate how PED can be used to help Starbucks ↑TR

1. Definition of PED/Value of PED – Price-elastic/Price-inelastic means?
2. Explain how to vary price according to value of PED to ↑TR

✓↑P🡪Ped is price-inelastic/↓P – Ped is price-elastic

✓Explain economic causation

✓Draw diagram and describe diagram

1. Explain why PED for Starbucks consumers will be price-elastic or price-inelastic

✓Degree of necessity of demand

✓Proportion of income spent on the good

✓Time period for consideration of purchase

✓Availability of substitute

14.2 Explain and evaluate how YED can be used to help Starbucks ↑TR

1. Definition of YED and value of YED –

Positive – Normal, Negative - Inferior

1. Usefulness of YED in helping Starbucks to ↑ TR

✓Derive information on consumer’s degree of price sensitivity to the types of coffee offered by Starbucks 🡪 derive price strategy 🡪↑TR

✓Understanding of the consumers in the classification of goods – raise market demand by selling the types of goods derived under different economic conditions (↑Y🡪 sell normal good market demand 🡪↑TR)

1. Explain how YED for Starbucks consumers is determined

✓Price of good/ proportions of income spent on the good

14.3 Explain and evaluate how XED can be used to help Starbucks ↑TR

1. Definition of XED and value of XED

Positive – Substitutes , Negative - Complementary

1. Usefulness of XED in helping Starbucks to ↑TR

✓Information on related goods 🡪conduct sales and marketing strategy

✓Complementary🡪joint promotion🡪↑market demand🡪↑TR

✓Substitutes – SR 🡪price strategy 🡪maintain competitiveness 🡪↑TR

– LR 🡪Promotion 🡪brand loyalty🡪shape PED to become price-inelastic🡪↑P🡪↑TR (avoid price competition)

14.4 Limitations of Elasticity of Demand

1. Time span is too long – economic data is inaccurate
2. Ceteris paribus condition cannot hold in the real world
3. Social variables are not accounted but significant in influencing consumer behaviour

**Explain if the demand for tour is price elastic or price inelastic.**

**Introduction :
definition of PED
meaning of price elastic and price inelastic**

**Analyse the determinants of PED in the nature of the tour market

Main Body**

**1. state the all the determinants of PED
2. Explain how the determinants are affected the nature of the demand for tour**

**2.1 – degree of necessity of demand – in general – high degree of necessity of demand – based on holiday period to determine the value of PED (elaborate)
2.2 – proportion of income spent on the tour – destination of tour , income of the consumers
2.3 availability of substitutes- choice of tour, how you embark on holidays (free and easy or with tour packages)
2.4 time period for consideration of purchase – how long you plan for tour – long period – more choices – higher degree of substitution – PEDcis price elastic
3. Analysis- assumptions given**

**Conclusion**

**The concept used to explain this and the accuracy of this economic principle to assess the value of PED.**