

Topic: Elasticity

Price Elasticity of Demand (PED)

- Starter activity: [Google form introduction](#)
- **PED**: Price Elasticity of Demand is a measure of the **responsiveness** of the **quantity demanded** of a good or service when there is a **change in its price**. ([watch video](#))

Calculate PED

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

$$\text{PED} = \frac{\Delta Q}{\Delta P} \times \frac{P_1 + P_2}{Q_1 + Q_2}$$

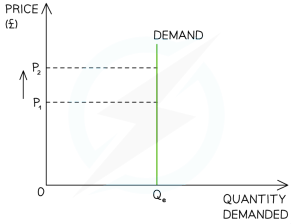
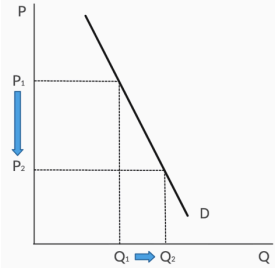
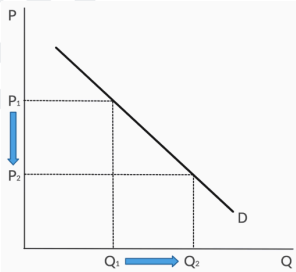
Question: A consumer / motorist buys 20 litres of petrol when the price is €1.60 per litre. When the price increases to €1.70, as a result of increase in carbon tax, the consumer buys 19 litres. Calculate PED. Show all your workings:

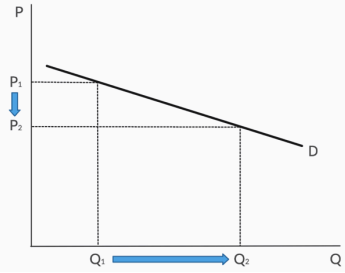
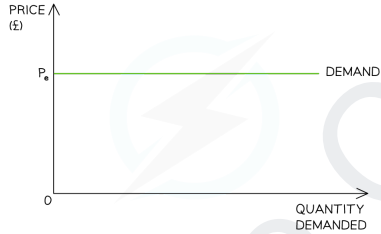
Answer:

Question: Consumer buys 50 units of a product when the price is €1.50. When the price is reduced to €1 consumers buy 90 units. Using the appropriate formula, calculate consumers PED. Show your workings

Answer:

Interpreting PED Values

Value	Name and Diagram	Explanation
0	<ul style="list-style-type: none"> Perfectly Inelastic 	<p>$PED = \infty$</p> <p>The QD is completely unresponsive to a change in P. As price increases, quantity demanded does not change.</p> <p>Very theoretical value e.g. heart transplant is extremely inelastic but possibly not perfectly</p>
0 → 1	<ul style="list-style-type: none"> Relatively Inelastic 	<p>$PED < 1$. (e.g. -0.2)</p> <p>A percentage change in price causes a less than proportionate percentage change in quantity demanded.</p> <p>(e.g. addictive products)</p>
1	<ul style="list-style-type: none"> Unitary Elasticity 	<p>$PED = -1$.</p> <p>A percentage change in price causes an equal percentage change in quantity demanded.</p>

1 → ∞	<ul style="list-style-type: none"> Relatively Elastic 	<p>PED is elastic. $PED > 1$.</p> <p>A percentage change in price causes a greater than proportionate percentage change in quantity demanded.</p> <p>(e.g. luxury products)</p>
∞	<ul style="list-style-type: none"> Perfectly Elastic 	<p>The %Δ in QD will fall to zero with any %Δ in P (highly theoretical elasticity)</p>

Sign and Size of PED

Sign	Size
<ol style="list-style-type: none"> PED is always negative – because of law of demand The exceptions to law of demand eg. Giffen good, snob good result in a positive PED 	<p>The bigger the number the greater the proportionate change in quantity demanded to change in price (or more responsive consumers are to change in price)</p> <ol style="list-style-type: none"> Elastic Unitary elastic Inelastic

Determinants of PED

- Some products are more responsive to **changes in prices** than other products

Factor	Explanation
The number of close substitutes	
The proportion of income which is spent on income	
The length of time involved	
The durability of the good	
Number of alternative uses good has	
Nature of the good	

The Implications of PED for Stakeholders

Firms

- Knowledge of PED** is important to **firms / retailers** seeking to **maximise their revenue**
- If their product is **price inelastic in demand**, they should **raise their prices** (because as price increases, quantity demanded falls, but by a less than proportionate amount).
- If **price elastic** in demand, then they should **lower their prices** (because as price decreases, quantity demanded rises, but by a greater than proportionate amount).

Government

- Knowledge of PED** is important to **Governments** with regard to **taxation**
- If they **tax price inelastic in demand products**, they can raise tax revenue without harming firms too much
- Consumers are less responsive to price changes so **firms will pass on the tax** to the consumer

True or False Exercise

Statement	True	False
When demand for a good is price elastic, a reduction in price will lead to a decrease in total revenue		
When many close substitutes are available, demand for any of them should be highly elastic		
When consumers are strongly attached or loyal to a product, it is elastic		
When a product accounts for a small fraction of consumers weekly expenditure the good is highly inelastic		

PED Exam Questions

Exam Paper 2023

On the 3rd of March, 2022 the price of petrol in Ireland broke the €2 barrier for the first time.
Adapted from independent.ie

- (a) Select, using a tick (✓) if petrol is considered to have price elastic demand or price inelastic demand.
Explain your answer. Price elastic: Price inelastic:

Explanation:

Answer (b) or (c)

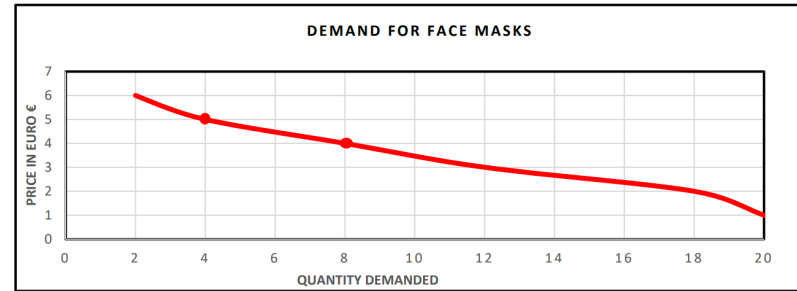
- (b) Outline two reasons why it is important for retailers to understand the concept of price elasticity of demand.

1.
2.

2022 SEC exam Q.

Question 1

- (a) Using an appropriate formula, calculate the **price elasticity of demand** depicted in the graph below where the original price of the packet of face masks is €4 and then **increases** to €5. Show all calculations.



Workings:

Answer:

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- (b) With reference to the graph above explain the law of demand.

Question 13

- (c) (i) Apple AirPods (earphones) price fell from €160 to €125 online. The quantity demanded increased from 10,000 units to 15,000 units. Calculate the **Price Elasticity of Demand** of Apple AirPods.

Workings:

Answer:

- (ii) Based on the figure you have calculated in (i) above, state whether the demand for Apple AirPods is elastic or inelastic. Give a reason for your answer.

Answer:

Reason:

- (iii) If a firm selling the above product intends to maximise revenue from the sale of this product should it, **increase, decrease or maintain the same price?** Explain your answer.

Answer:

Explanation:

Income Elasticity of Demand (YED)

- **Income Elasticity of demand (YED):** measures the responsiveness of a change in quantity demanded to a change in income
- YED can be calculated using the following formula:

Calculate YED

$$\frac{\Delta Q}{\Delta Y} \times \frac{Y_1 + Y_2}{Q_1 + Q_2}$$

1. **Calculate:** The table below shows the annual average income in a country and the corresponding demand for product A for two years.

Year	Income €	Product A (units)
1	57,000	100
2	63,000	200

Answer:

2. **Calculate**

Assume income elasticity of demand for game consoles is +2.5 and total sales in 2008 were 100,000 units. Calculate the expected total sales for the year if consumers incomes are expected to fall by 8% in 2009. Show your workings

Answer:

3. Calculate:

YED for a good is **-0.50** and sales in year 1 are **120,000** units. If consumers' incomes are expected to **increase by 6%** in year 2, calculate the expected level of sales in year 2. Show your workings.

Answer:

4. Calculate:

Income elasticity of demand for a good is **+1.8** and sales in year 1 are 200,000 units. If the consumers incomes are expected to increase by 5% in year 2, calculate the expected level of sales. Show your workings.

Answer:

Interpreting YED Values

- The YED value can be **positive or negative** and the value is important in determining the type of good
 - A good with a **positive YED** value is considered to be a **normal good**
 - **Normal goods** can be classified as **necessities or luxuries**
 - A good with a **negative YED** value is considered to be an **inferior good**

YED Values (Sign & Size is important)

Value	Type of Good	Explanation
0→1	Normal necessity	<ul style="list-style-type: none"> Demand increases when income increases Income inelastic, it is relatively unresponsive to a change in income (increases by a less than proportionate amount) E.g petrol / bread / electricity
YED > 1	Normal luxury	<ul style="list-style-type: none"> Demand increases when income increases Income elastic, it is very responsive to a change in income (increases by a greater than proportionate amount) e.g branded goods / rolex / first class travel
YED < 0	Inferior Good	<ul style="list-style-type: none"> Demand decreases when income increases, vice versa e.g pennys jeans, instant noodles

True or False Exercise

Statement	True	False
Income elasticity of demand for luxury goods is positive		
A good with a YED of +2.5 is a inferior good		
An example of a good with a YED of 0.72 is bread		
Normal necessity goods are very responsive to a change in income		

5. Decide the type of good: (inferior, normal necessity, normal luxury)

	Type of good	Example of this good
Good X: +0.5		
Good Y: +2.6		
Good Z: -0.4		

6. a. Define the term **income elasticity of demand** and **price elasticity of demand**

b. Which figures stated below is most likely to represent each of the following:

- Income elasticity of demand for low price cuts of meat
- Income elasticity of demand for apple iphones
- Price elasticity of demand for petrol

Give reasons for your choice in each case.

-1.6	0.1	+4.3
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-1.6	
0.1	
+4.3	

7. Read newspaper article [here](#) and answer questions

Exam Question: 2024, Q16 (b)

(b) (i) Explain the term income elasticity of demand.

(ii) Using an appropriate formula and the figures in the table below, calculate the **income elasticity of demand (YED)** for this good. Explain the economic meaning of your answer. **Show your workings.**

Year	Average Income	Quantity Demanded
2022	€40,000	150 units
2023	€50,000	180 units

Workings:

Answer:

Explanation:

(iii) Assume the income elasticity of demand (YED) for a PlayStation 5 is + 5.2 and total sales in 2023 were 10,000 units. **Calculate the expected total sales** for the year if consumers' **incomes are expected to fall by 5%** in 2024. **Show your workings.**

Workings:

Answer:

Exam Question: 2023 Q2

Question 3

The table below shows the annual average level of income in a country and the corresponding demand for mobile phones for the two years 2020 and 2021.

Year	Income (€)	Mobile Phones (Units)
2020	60,000	150
2021	65,000	275

- (a) Using an appropriate formula, calculate the **income elasticity of demand (YED)** for mobile phones.

Workings:

Answer:

- (b) Using your knowledge of YED, explain the economic meaning of the figure you calculated in part (a) above.

Lorraine Clancy