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Price Elasticity of Demand (PED)
Notes

WHAT IS PRICE ELASTICITY OF DEMAND (PED)?

- responsiveness of quantity demanded to a change in price
- The higher the PED, the more responsive Qd will be to a price change
- Opposite true

CALCULATING PED

- $PED = \frac{\%\Delta Qd}{\%\Delta P}$
- $\%\Delta P = \frac{P_2 - P_1}{P_1} \cdot 100\%$
- $\%\Delta Qd = \frac{Qd_2 - Qd_1}{Qd_1} \cdot 100\%$

EXAMPLE

- Consumers buy 1000 movies from iTunes when the price is $1.00.
- When the price is decreased to $0.95, consumers buy 1,100 movies.

$$PED = \frac{\frac{1100-100}{1000} \cdot 100\%}{\frac{0.95-1.00}{1.00} \cdot 100\%}$$

$$PED = \frac{10}{-5}$$

$$= -2$$

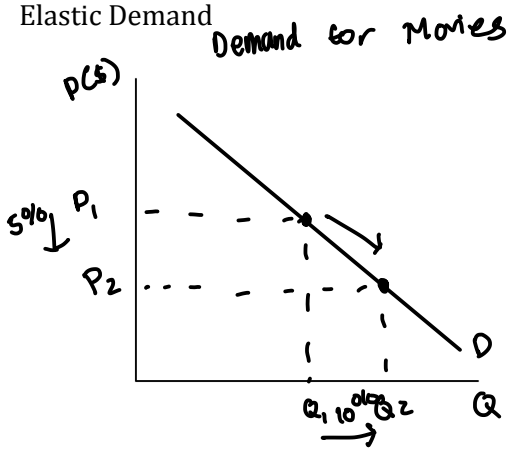
- Note: + and - do not matter

WHAT DO PED VALUES MEAN?

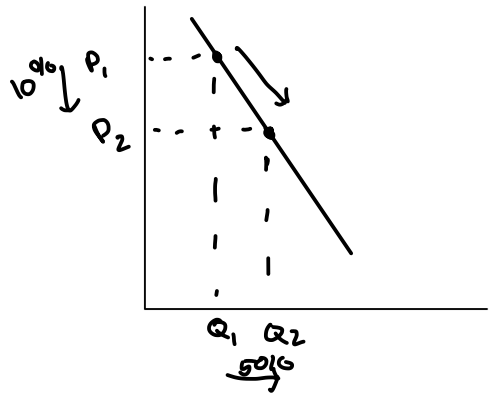
Elasticity Coefficient	Term	Description
>1	Elastic	very responsive! Quantity demanded changes by larger % than price
$=1$	Unit Elastic	Quantity demanded changes by same % as price
<1	Inelastic	Not very responsive! Quantity demanded changes by smaller % than price

ELASTICITY ON A DEMAND CURVE

Elastic Demand



Inelastic Demand

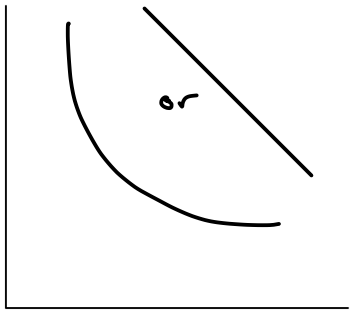


SPECIAL CASES

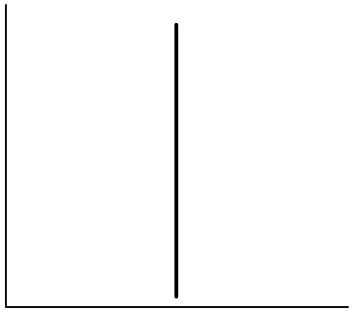
Elasticity Coefficient	Term	Description
= 1	Unit Elastic Demand	Percentage change in Qd = percentage change in P at all prices
= 0	Perfectly Inelastic Demand	Qd is completely unresponsive to Price
infinity	Perfectly elastic demand	Qd is infinitely responsive to Price

GRAPHING SPECIAL CASES

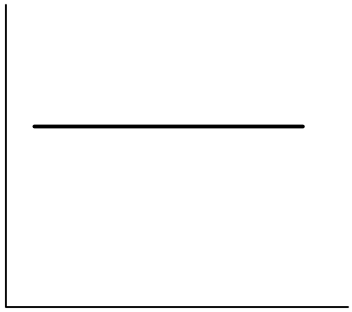
Unit Elastic Demand



Perfectly Inelastic Demand



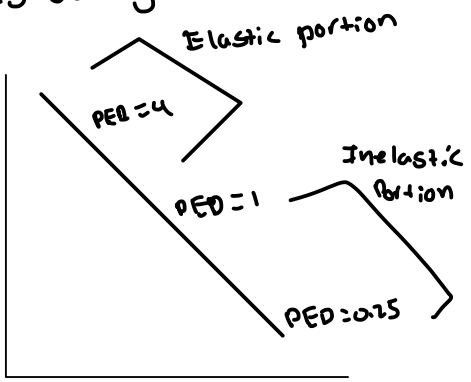
Perfectly Elastic Demand



ELASTICITY ≠ SLOPE

- The slope can give an indication
- Slope does not change along straight line demand curve

- PED more elastic at higher Prices usually.



DETERMINANTS OF PED

1. Number and closeness of substitutes
2. Necessities versus luxuries

Necessities are… goods we consider to be essential or necessary.

Luxuries are … not necessary or essential

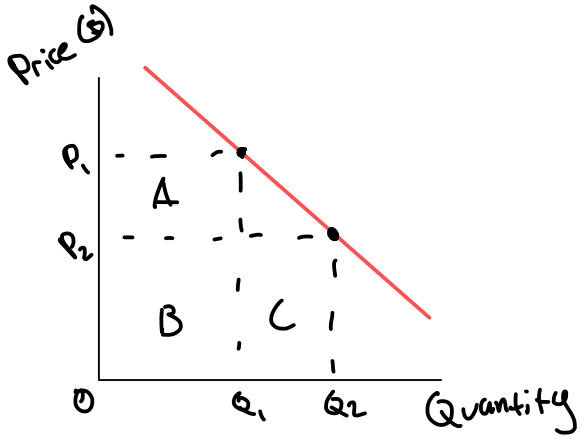
3. Length of time
4. Proportion of income
5. Whether it's habit-forming

WHY IS KNOWLEDGE OF PED IMPORTANT?

- An understanding of PED is important for FIRMS, as they can predict the effects of pricing decisions on quantity demanded and the revenue they make.

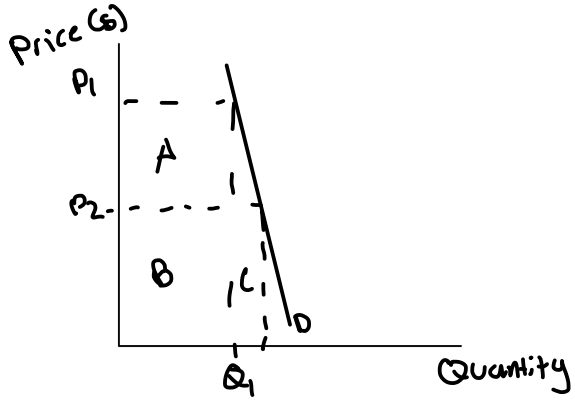
PED AND TOTAL REVENUE

- Total Revenue (TR) =



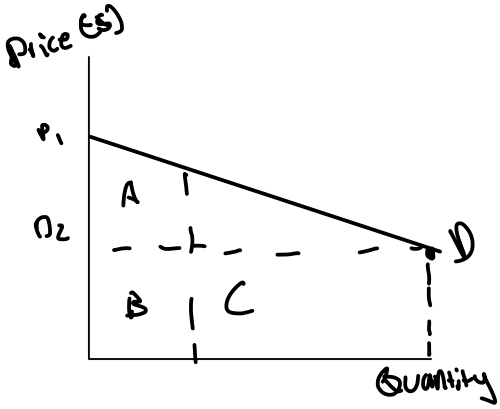
- If the firm decides to decrease price to P2, the degree of price elasticity in the curve will determine the extent of the increase in quantity demanded and the change therefore in total revenue.
- In this case, the firm originally earned a TR of A+ B. After the price change it earns a TR of B+C.

INELASTIC PED AND PRICE DECREASES



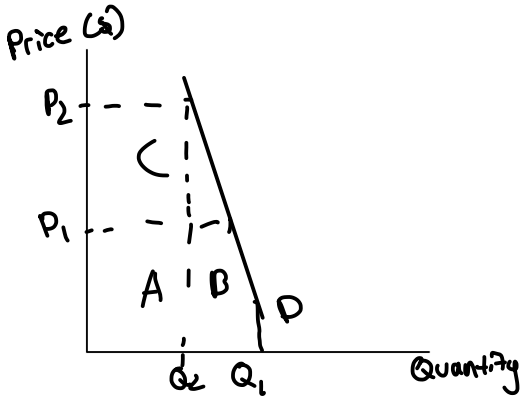
- Assume PED for a given product is INELASTIC and the producer decides to lower price to attract sales.
- A+B > B+C
- Total Revenue would fall overall.
- Not a good move!

ELASTIC PED AND PRICE DECREASES



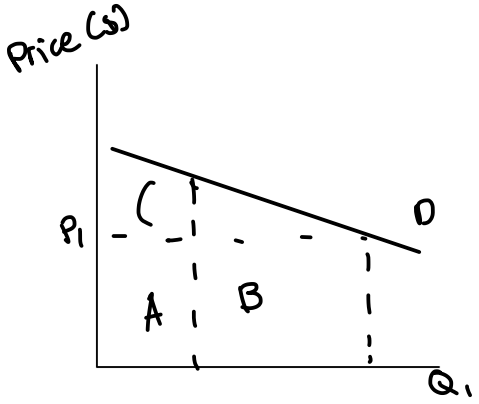
- Assume PED for a given product is ELASTIC and the producer decides to lower price to attract sales.
- A+B < B+C
- Total Revenue rises. Good Move!

INELASTIC PED AND PRICE INCREASES



- If PED in INELASTIC and price INCREASES, there is an opposite effect for TR.
- A+B < A+C
- Total Revenue would increase overall. Good Move!

ELASTIC PED AND PRICE INCREASES



- If PED in ELASTIC and price INCREASES, there is an OPPOSITE effect for TR.
- A+B > A+C
- Total Revenue would falls. Bad Move!

THE RULES

If demand is price **elastic**	If demand is price in**elastic**
• Increasing price would **reduce** TR (%Δ Qd > % Δ P) • Reducing price would increase TR • %ΔQd > %Δ P	• Increasing price would **increase** TR (%Δ Qd < % Δ P) • Reducing price would reduce TR • %ΔQd < %Δ P

PED'S IMPORTANCE FOR GOVERNMENT

- GOVERNMENTS also need to under PED because when they increase…
- If a government taxes an INELASTIC good, the tax revenue they will receive will be more than if they tax an ELASTIC good.
- Firms that produce an Inelastic good will lose less revenue when taxed than firms in an elastic industry, which can lead to unemployment.

Price Elasticity of Demand (PED)
Activity Set

Activity 1 – Fill in Blanks

Complete the paragraph on price elasticity of demand (PED) using the key words below. There are **twenty spaces** with **twenty corresponding keywords** so cross off each keyword as you use it. This activity will test your understanding of the vocabulary used in this topic.

Please choose from the following keywords:

Price	Magazine	Quantity Demanded	Negative	Higher
Revenue	Taxation	Quantity Demanded	Inverse	Perfectly price inelastic
Responsiveness	Inelastic	Perfectly unit elastic	Elastic	Government
Perfectly price elastic	Inelastic	Price	Tobacco	Firms

Price elasticity of demand measures the _responsiveness_ of _quantity demanded_ to a change in _price_. An awareness of price elasticity of demand is important to economic agents such as _governments_ and _firms_.

In the case of governments, PED can influence economic policies, particularly those relating to _taxation_. For example, higher taxes are generally imposed on goods and services with price _inelastic_ demand, such as alcohol and _tobacco_, as demand for these goods is less responsive than those with price elastic demand, such as _magazines_. This raises more tax _revenue_ for the government, allowing them to increase their spending on projects such as healthcare, education and infrastructure.

Firms also find PED useful as it influences decisions on how best to price their goods and services. Price elasticity of demand is calculated by dividing the percentage change in _quantity demanded_ of a good by its percentage change in _price_.

There is always a _____ sign placed in front of the PED value, although it is often ignored by economists. The negative sign represents the relationship between the price charged, and quantity demanded (there is an _____ relationship between the price charged and quantity demanded).

If PED is higher than 1 (>1), demand is price _____. This means that any change in price leads to a proportionally _____ change in quantity demanded. Demand is said to be more responsive to a change in price if it is price elastic.

If PED is less than 1 (<1), demand is price _____. This means that any change in price leads to a proportionally smaller change in the quantity demanded. Demand is said to be less responsive to a change in price if it is price inelastic.

A PED of 0 means demand is _____. A PED of 1 means demand is _____. A PED of infinity means demand is _____.

Activity 2 – Calculations

Complete the table below. This activity will test your ability to calculate percentage changes, price elasticity of demand and recognize whether demand is price elastic, inelastic or unitary elastic.

Price Elasticity of Demand				
Scenario	*Percentage Change in quantity demanded*	*Percentage change in price*	*Price Elasticity of Demand Answer (value)*	*Price Elastic/ Inelastic/ Unit Elastic*
A well-known fast-food chain has a restaurant located in a highway service station. The closest service station to this one is 30 miles away. It is the only restaurant at the service station to sell burgers. The restaurant decides to increase the price of one of its meals from $5 to $6. As a result of this price increase, the quantity of meals purchased within a month of this change falls from 1000 to 930.				
A market-leading branded Cola soft drink has a prime position on the shelves of the drinks aisle in a supermarket next to the drinks of its competitors, which are cheaper. The supermarket decides to increase the price of the market-leading drink from $0.69 to $0.75 per can. The quantity of this soft drink demanded falls from 420 to 310 cans.				
A state-owned water company in country X reduces the annual water bill charge to its population from $412 to $410 per annum. The quantity of water demanded increases from 0.3bn tonnes to 0.301bn tonnes.				
A government decides to increase the taxes consumers pay on tobacco. This leads to a price increase of 2%. As a result of this tax increase, the quantity demanded falls from 3 billion to 2.95 billion.				

Activity 3- Developing Your Answers

Look back at the four scenarios outlined in the table from activity 2. In this section, use the sentence structure provided and one of the keywords below to explain why you believe each good / service has that type of elasticity.

Keywords:

Brand image	Addictiveness	Time	Proportion of Income
Necessity	Luxury	Price of substitutes	Availability of substitutes

Scenario 1 (Fast food restaurant at a service station)

From my calculations, I believe that this good / service has (write elastic /inelastic / unitary) _____ demand.

The cause for this is (choose and write one of the 8 words in the boxes above and place in a sentence):

Explanation:

Scenario 2 (Cola based soft drink)

From my calculations, I believe that this good / service has (write elastic /inelastic / unitary) _____ demand.

The cause for this is (choose and write one of the 8 words in the boxes above and place in a sentence):

Explanation:

Scenario 3 (State-owned water company)

From my calculations, I believe that this good / service has (write elastic /inelastic / unitary) _____ demand.

The cause for this is (choose and write one of the 8 words in the boxes above and place in a sentence):

Explanation:

_____
_____
_____
_____
_____
_____

Scenario 4 (Tobacco)

From my calculations, I believe that this good / service has (write elastic /inelastic / unitary) _____ demand.

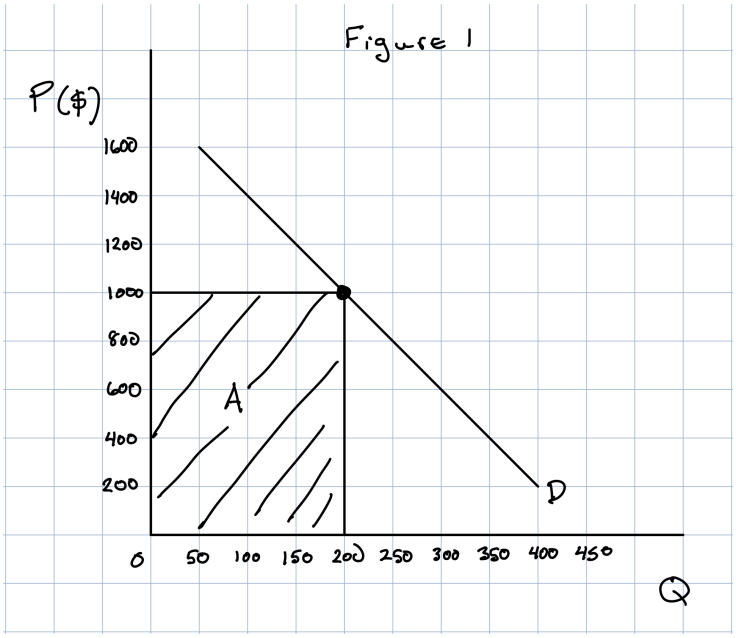
The cause for this is (choose and write one of the 8 words in the boxes above and place in a sentence):

Explanation:

_____
_____
_____
_____
_____
_____

Activity 4 – Revenue Boxes

A revenue box is, quite simply, a box drawn on a demand curve diagram to illustrate how much revenue a business generates at different prices. Revenue is calculated by multiplying the selling price by the quantity demanded. It shows how much money a business has generated before costs are subtracted. Revenue minus costs = profit (more on this in a later topic)



When a price of $1,000 is charged, the quantity demanded is 200 units.

Therefore, the revenue generated will be 1000 X 200 = $200,000.

This is represented by box “A” on the diagram.

Any price changes will affect the amount of revenue a business generates.
The price elasticity of demand for the product / service will also affect the amount of revenue generated.

For each of the diagrams below:

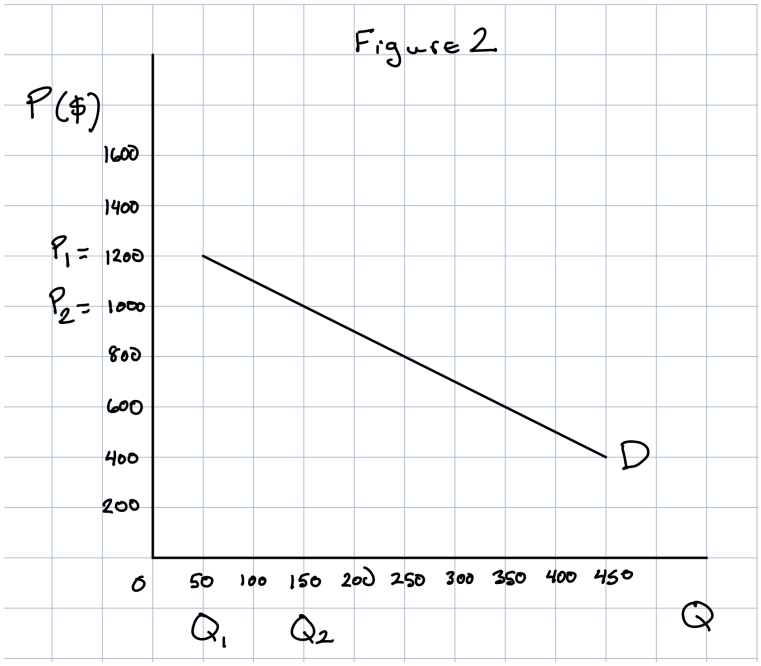
1. Calculate the revenue at the original price.

2. Calculate the revenue at the new price.

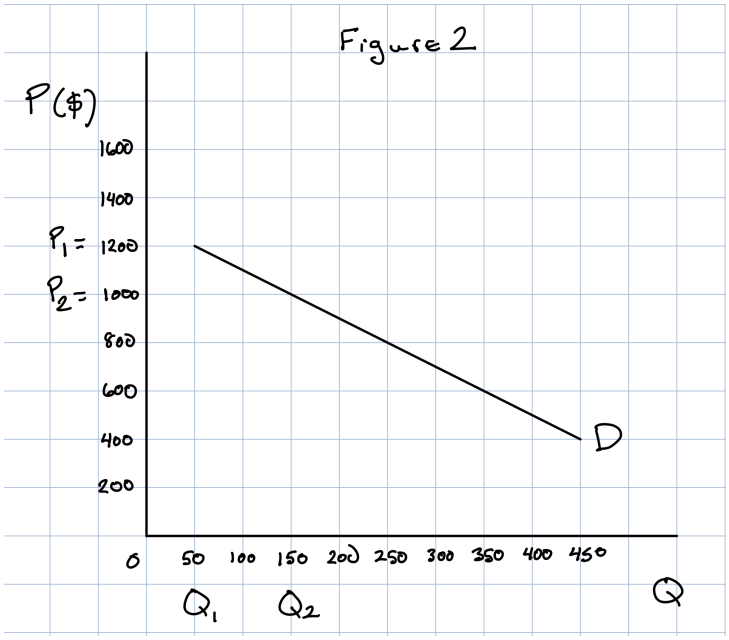
3. Draw two revenue boxes on each diagram to show the original and new revenue (you may want to label them “A,” “B,” and / or “C” so that the boxes are clear).

4. State whether demand is price elastic or inelastic.

5. Explain how the type of elasticity affects the revenue generated when the prices changes.



Answer:



Answer:

Activity 5 – Diagrams

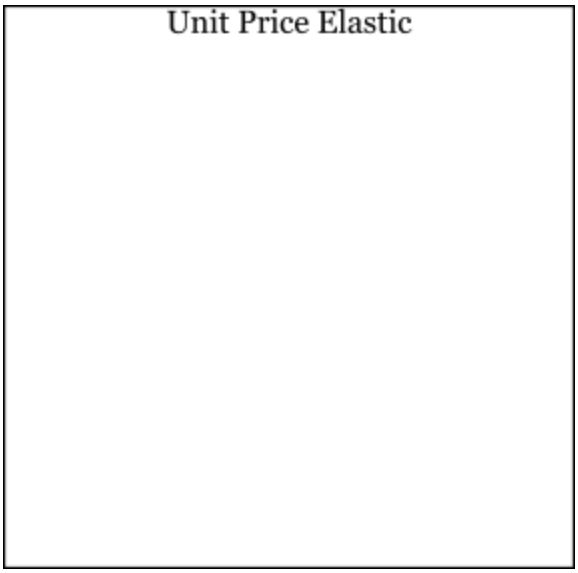
Draw and fully label the price elasticity diagrams as requested in the boxes below. Make sure you demonstrate the impact of a change in price on the quantity demanded on each diagram.

Relatively Price Elastic

Relatively Price Inelastic

Perfectly Price Elastic

Perfect Price Inelastic



Explain, using examples, why two products in the same market could have different types of elasticity of demand.

_____
_____
_____
_____
_____
_____

Activity 6 – Application / Calculations

1. A premium coffee brand originally sold bags of coffee for $10. At this price, $100,000 revenue was generated in a year. The following year, they decided to increase the price of their bags to $12. They have calculated the price elasticity of demand of their bags of coffee to be -1.3

Calculate the percentage change in revenue when the price of coffee bags increases to $12. Write answer and show working out below:

Answer.....

Show all working below:

2. A new music streaming service has 1m customers paying $12.50 per month for their subscription. They have calculated the PED of this service to be -2. If they reduce the price of their monthly subscription by £2.50 to make them more competitive, the change in revenue will be (circle one):

A $£3 million

B -$1.5 million

C -$3 million

D +$1.5 million

Show all working out below: