

LEARNING UNIT 6

- **DATE:** March 2014
- **MODULE:** PMIC6111
- **TEXTBOOK REFERENCE:** pg 153 -173
- **THEME:** ELASTICITY

- **OBJECTIVES:** BY END OF LEARNING UNIT 6 – YOU SHOULD KNOW THE FOLLOWING:
 - DEFINE ELASTICITY
 - EXPLAIN MEANING AND SIGNIFICANCE OF PRICE ELASTICITY OF DEMAND
 - EXPLAIN MEANING OF SPECIFIC ELASTICITY COEFFICIENT $e_p = 1,8$
 - IDENTIFY VALUE OF e_p VARIOUS POINTS ON A LINEAR DEMAND CURVE
 - CALCULATE PRICE ELASTICITY OF DEMAND USING ARC ELASTICITY FORMULA
 - EXPLAIN LINK BETWEEN PRICE ELASTICITY OF DEMAND AND TOTAL REVENUE FROM SALES
 - DISTINGUISH BETWEEN 5 DIFFERENT CATEGORIES OF PRICE ELASTICITY OF DEMAND
 - EXPLAIN EFFECT ON TOTAL REVENUE OF A CHANGE IN SUPPLY WHEN DEMAND CURVES HAVE DIFFERENT ELASTICITIES
 - EXPLAIN DETERMINANTS OF PRICE ELASTICITY OF DEMAND
 - DEFINE AND CALCULATE CROSS ELASTICITY OF DEMAND AND CLASSIFY GOODS ON BASIS OF CROSS ELASTICITY
 - EXPLAIN MEANING AND SIGNIFICANCE OF PRICE ELASTICITY OF SUPPLY

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➤ **DEFINITION**

- **FORMAL DEFINITION:** “THE PERCENTAGE CHANGE IN A DEPENDENT VARIABLE IF THE RELEVANT INDEPENDENT VARIABLE CHANGES BY ONE (1) PERCENT”

- SUPPLY AND CURVE ANALYSIS USED TO EXPLAIN:
 - HOW PRICE OF A PRODUCT IS DETERMINED
 - PREDICT WHAT WILL HAPPEN IF A PRICE OF A COMPLEMENT GOOD CHANGES
 - ANALYSE EFFECTS OF A SUBSIDY OR TAX ON PRICES AND QUANTITIES

- WE HAVE ANALYSED DIRECTION (RIGHTWARD; LEFTWARD; UP;DOWN) OF CHANGES IN SUPPLY AND DEMAND

- NOW WE WILL ANALYSE THE **MAGNITUDE** OF THE CHANGE IE BY HOW **MUCH** WILL PRICE AND QUANTITY CHANGE WHEN DEMAND AND SUPPLY CHANGES

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➤ **INFORMAL DEFINITION**

- ELASTICITY IS A MEASURE OF RESPONSIVENESS OR SENSITIVITY
- TWO VARIABLES ARE RELATED – HOW RESPONSIVE IS THE DEPENDENT VARIABLE TO CHANGES IN THE INDEPENDENT VARIABLE

➤ **FORMULA**

$$\text{ELASTICITY} = \frac{\text{PERCENTAGE CHANGE IN DEPENDENT VARIABLE}}{\text{PERCENTAGE CHANGE IN INDEPENDENT VARIABLE}}$$

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➤ **4 TYPES OF ELASTICITY**

- **PRICE ELASTICITY OF DEMAND**
- **INCOME ELASTICITY OF DEMAND**
- **CROSS ELASTICITY OF DEMAND**
- **PRICE ELASTICITY OF SUPPLY**

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- **PRICE ELASTICITY OF DEMAND**
 - LOOKING AT DEMAND CURVE
 - DEPENDENT VARIABLE = QUANTITY DEMANDED
 - INDEPENDENT VARIABLE = PRICE OF PRODUCT
 - IN OTHER WORDS: THE QUANTITY DEMANDED DEPENDS ON THE PRICE
- **IMPORTANT:**
 - **PERCENTAGE CHANGES** ARE USED (RELATIVE CHANGES **NOT** ABSOLUTE CHANGES)
 - PRICE ELASTICITY OF DEMAND IS RATIO OF % CHANGE IN QUANTITY DEMANDED TO PERCENTAGE CHANGE IN PRICE
 - ANSWER TO ELASTICITY CALCULATION IS A NUMBER – CALLED **ELASTICITY COEFFICIENT**
 - ELASTICITY COEFFICIENTS HELP US COMPARE (REACTIONS OF DIFFERENT PRODUCTS TO CHANGES IN PRICES)
 - ANSWERS WILL BE **NEGATIVE** – PRICE AND DEMAND MOVE IN OPPOSITE DIRECTIONS

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- **CALCULATING PRICE ELASTICITY OF DEMAND**
 - 1. NEED TO CALCULATE % CHANGE IN QUANTITY DEMANDED
 - $\frac{\Delta Q}{Q} \times 100$
 - 2. NEED TO CALCULATE % CHANGE IN PRICE OF PRODUCT
 - $\frac{\Delta P}{P} \times 100$
 - 3. EQUATION (9.1)

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- $e_p = \frac{\% \text{ change in quantity demanded}}{\% \text{ change in price of product}}$
- **SLOPE OF LINEAR CURVE:**
 - GIVEN BY CHANGE IN PRICE DIVIDED BY CHANGE IN QUANTITY
 - FIGURE 9.1 (TEXTBOOK PG 156)
 - POINTS A; B; C; D; E
 - ELASTICITY VARIES FROM INFINITY (∞) TO ZERO (0)

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- ARC ELASTICITY CALCULATES THE ELASTICITY COEFFICIENT BY COMPARING TWO POINTS ON A DEMAND CURVE
- THE FORMULA FOR ARC ELASTICITY IS MUCH EASIER TO USE: PG159 TEXTBOOK

$$\text{➤ } e_p = \frac{(Q_2 - Q_1) / (Q_1 + Q_2)}{(P_2 - P_1) / (P_1 + P_2)}$$



- BECAUSE WE IGNORE THE NEGATIVE SIGN, ARC ELASTICITY SHOULD GIVE YOU THE SAME ANSWER FROM BOTH POINTS ON THE CURVE

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➤ PRICE ELASTICITY OF DEMAND AND TOTAL REVENUE/EXPENDITURE

- PRICE ELASTICITY CAN BE USED TO DETERMINE HOW MUCH THE TOTAL EXPENDITURE (OR TOTAL REVENUE (TR) OF PRODUCERS) BY CONSUMERS ON A PRODUCT CHANGES WHEN THE PRICE OF A PRODUCT CHANGES
- **Jerry can determine how much more/less consumers will spend on his cars when he decreases/increases his prices**



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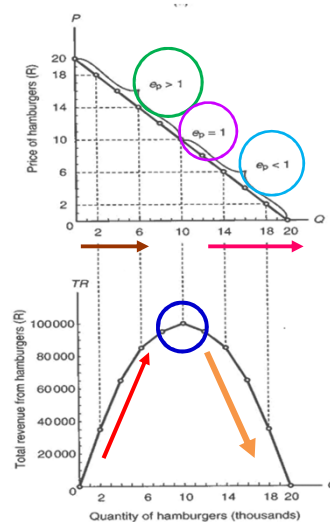
- IF CHANGE IN PRICE → **GREATER** CHANGE IN **QUANTITY DEMANDED** → TR WILL CHANGE IN **OPPOSITE** DIRECTION TO PRICE CHANGE
- IF CHANGE IN PRICE → **EQUAL** CHANGE IN **QUANTITY DEMANDED** → TR WILL REMAIN **UNCHANGED**
- IF CHANGE IN PRICE → **SMALLER** CHANGE IN **QUANTITY DEMANDED** → TR WILL CHANGE IN **SAME** DIRECTION AS PRICE CHANGE

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If price elasticity of demand is greater than 1, TR increases as the quantity sold (Q) increases

TR reaches a maximum when the price elasticity of demand is equal to 1

If the price elasticity of demand is smaller than 1, TR decreases as Q increases



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• 5 CATEGORIES OF PRICE ELASTICITY OF DEMAND

1. Perfectly inelastic demand
2. Inelastic demand
3. Unit elastic demand
4. Elastic demand
5. Perfectly elastic demand



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- PERFECTLY INELASTIC DEMAND
- REFERS TO A SITUATION WHERE THE PRICE ELASTICITY OF DEMAND IS **ZERO**
- REPRESENTED BY A VERTICAL LINE PARALLEL TO THE PRICE AXIS
- CONSUMERS PLAN TO PURCHASE A FIXED AMOUNT OF THE PRODUCT IRRESPECTIVE OF ITS PRICE
- PRODUCERS CAN THUS RAISE THEIR REVENUE BY INCREASING THE PRICE
- WHEN P INCREASES AND Q REMAINS CONSTANT, TR INCREASES



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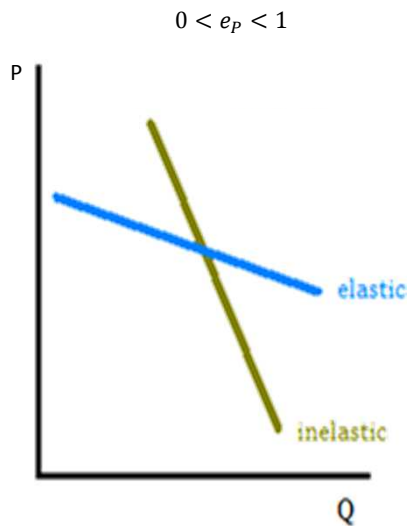
- IF JERRY'S CARS HAVE A PERFECTLY INELASTIC DEMAND, HE CAN SELL HIS CARS AT ANY PRICE AND CONSUMERS WILL STILL BUY THEM



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2. INELASTIC DEMAND

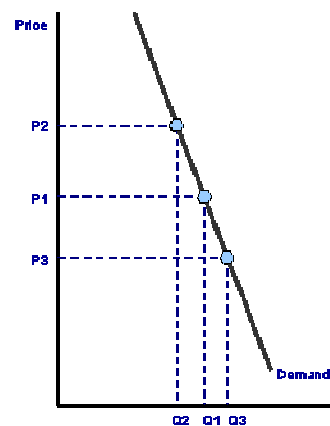
- WHEN A CHANGE IN PRICE LEADS TO A CHANGE IN QUANTITY, BUT THE CHANGE IN PRICE IS **GREATER** THAN THE PERCENTAGE CHANGE IN QUANTITY
- THE ELASTICITY COEFFICIENT IS **GREATER** THAN ZERO, BUT **LESS** THAN 1
- PRODUCERS WILL HAVE AN INCENTIVE TO **RAISE** THE PRICE SINCE THE PERCENTAGE CHANGE IN PRICE WILL BE GREATER THAN THE PERCENTAGE CHANGE IN THE QUANTITY SOLD
- IF THE PRICE OF THE PRODUCT INCREASES, THE PRODUCERS TR WILL INCREASE



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$$0 < e_p < 1$$

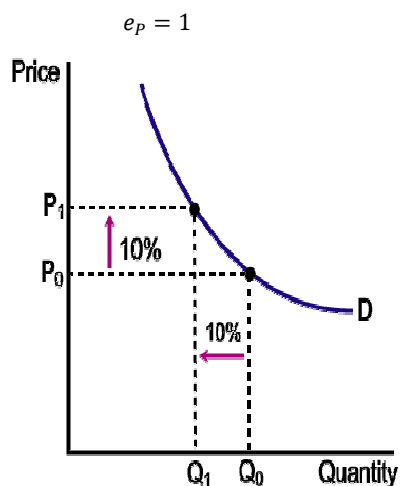
IF JERRY INCREASES HIS PRICES, A GREAT INCREASE IN PRICE WILL NOT LEAD TO A GREAT DECREASE IN THE QUANTITY DEMANDED FOR HIS CARS



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3. UNIT ELASTIC DEMAND

- OCCURS WHEN THE PERCENTAGE CHANGE IN THE QUANTITY DEMANDED IS EXACTLY EQUAL TO THE PERCENTAGE CHANGE IN PRICE
- UNIT ELASTICITY IS THE DIVIDING LINE BETWEEN ELASTIC AND INELASTIC DEMAND
- PRODUCERS **CANNOT RAISE** REVENUE BY INCREASING OR DECREASING THE PRICE
- TR WILL REMAIN UNCHANGED



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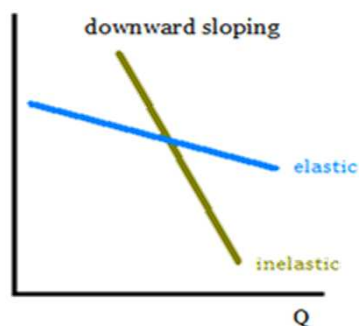
4. ELASTIC DEMAND

$$1 < e_p < \infty$$

WHEN A CHANGE IN PRICE LEADS TO A **GREATER** CHANGE IN THE QUANTITY DEMANDED

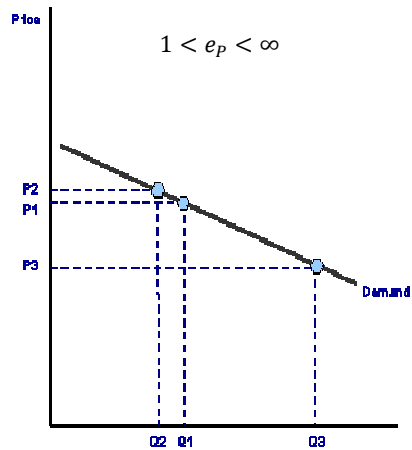
PRODUCERS CAN INCREASE THEIR REVENUE BY **LOWERING** THE PRICE OF THE PRODUCT

THERE IS NO INCENTIVE TO RAISE THE PRICE



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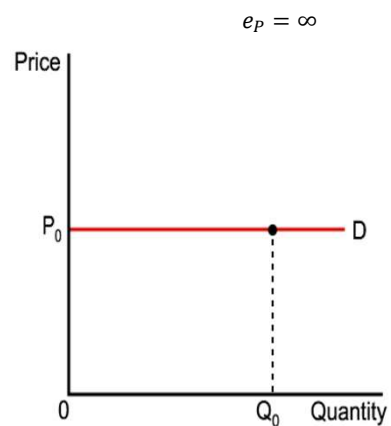
IN THIS CASE JERRY CAN
INCREASE SALES BY LOWERING
HIS PRICES



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5. PERFECTLY ELASTIC DEMAND

- HAS AN ELASTICITY COEFFICIENT OF **INFINITY**
- CONSUMERS ARE WILLING TO PURCHASE ANY QUANTITY AT A CERTAIN PRICE, BUT IF THE PRICE INCREASES, THE QUANTITY DEMANDED FOR THE PRODUCT WILL FALL TO ZERO



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- IF JERRY INCREASES HIS PRICES HE WILL SELL NO CARS



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➤ Determinants of the Price Elasticity of Demand

- What makes some goods elastic and others inelastic?
 - 1) **SUBSTITUTION POSSIBILITIES**
 - The more substitutes available – the more price elastic is demand
 - Eg beef/mutton; butter/margarine
 - 2) **DEGREE OF COMPLEMENTARITY OF THE PRODUCT**
 - The more complementary – the more inelastic is demand
 - Eg – sugar (tea/coffee)
 - 3) **TYPE OF WANT SATISFIED BY THE PRODUCT**
 - Whether a good is a necessity or luxury
 - Eg – basic foodstuffs vs luxury motor vehicles

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- 4) **Time period**
 - More elastic in the long run
 - Eg airfares
- 5) **Proportion of income spent on product**
 - Greater the % of income spent on a product – the greater the price elasticity
 - Lower the % of income spent on a product – the lower the price elasticity
 - Eg Matches vs Meat
 - Matches – low % of income is spent – low price elasticity
 - Meat – large % of income spent – high price elasticity

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- **INCOME ELASTICITY OF DEMAND**
 - As income rises – quantity demanded usually increases
 - $e_y = \frac{\% \text{ change in quantity demanded of a product}}{\% \text{ change in consumers income}}$
 - **Positive income elasticity = normal good**
 - I.e as income increases – quantity demanded increases
 - Normal goods – essential goods (e_y less than 1)
 - luxury goods (e_y more than 1)
 - **Negative income elasticity = inferior good**
 - I.e as income increases – quantity demanded decreases

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➤ CROSS ELASTICITY OF DEMAND

- $ec = \frac{\% \text{ change in quantity demanded of product A}}{\% \text{ change in price of product B}}$
- Negative coefficient: complementary good
- Positive coefficient: substitute good

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The price elasticity of supply

- **Price elasticity of supply** – the ratio between the percentage change in the quantity supplied of a product and the percentage change in the price of the product
- By how much will the quantity supplied change if the price changes by one per cent?

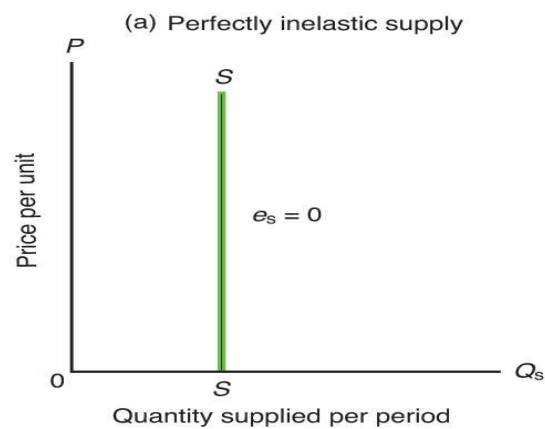
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Different categories of price elasticity of supply:

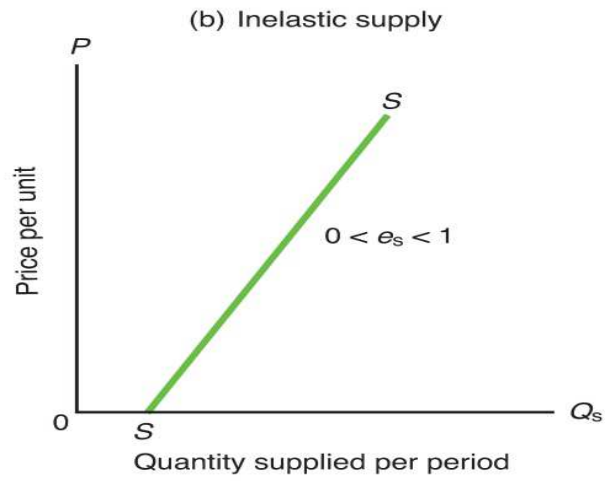
- Perfectly inelastic supply ($e_s = 0$)
- Inelastic supply ($0 < e_s < 1$)
- Unitary elastic supply ($e_s = 1$)
- Elastic supply ($1 < e_s < \infty$)
- Perfectly elastic supply ($e_s = \infty$)

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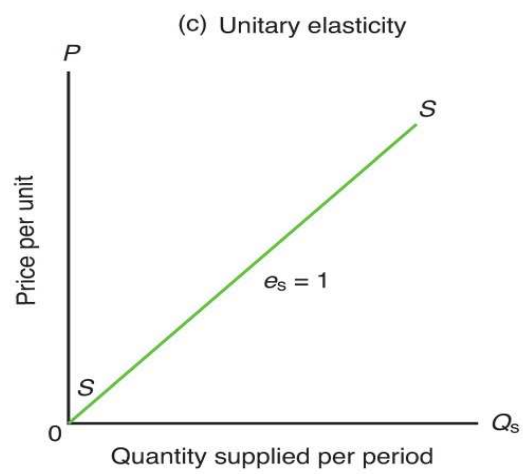
• *The different categories of price elasticity of supply*



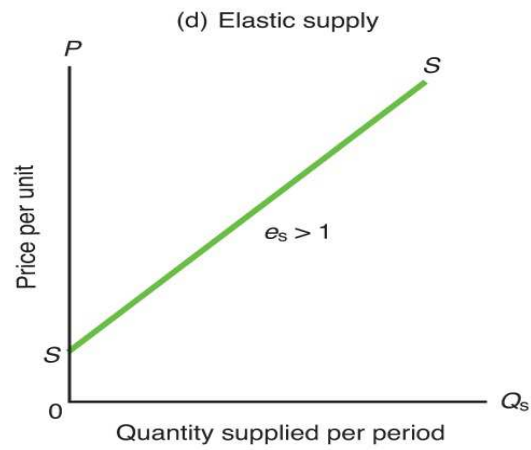
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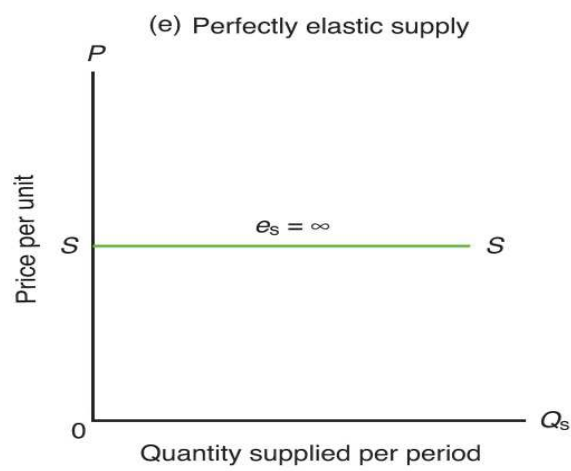
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Determinants of the price elasticity of supply:

- Time
- Expectations
- Stockpiling
- Excess capacity
- Availability of inputs