

ELASTICITY

EXAMPLES

ECON 201 Principles of MicroEconomics Assignment 2

Question 1

a) **What is the difference between perfectly elastic and perfectly inelastic demand? Use a graph in your explanation.**

Perfectly elastic demand has an infinite elasticity. If there is any price change at all, the quantity demanded vanishes. A perfectly elastic demand curve looks horizontal.

Perfectly inelastic demand has zero elasticity. Price changes do not affect quantity, so the percentage change in quantity demanded is zero. A perfectly inelastic demand curve looks vertical.

b) **Why does income elasticity of demand reveal whether goods are normal or inferior?**

Income elasticity measures the relative change in quantity demanded when consumer incomes change.

If incomes increase and quantity demanded increases also, the income elasticity of demand will be positive. This is what happens with normal goods.

If incomes increase and quantity demanded decreases, income elasticity will be negative, and it will be measuring the change in an inferior good.

c) **Why does cross-price elasticity of demand reveal whether two goods are substitutes or complements?**

Cross-price elasticity of demand measures the relative change in the quantity demanded of one good when the price of a related good changes.

If the sign of the cross-price elasticity of demand is positive, quantity demanded of Good A has increased when the price of Good B has increased. This happens when the two goods are substitutes.

If the sign is negative, then the quantity demanded of Good A has decreased when the price of Good B has increased. This is the case for complements.

d) **How do the various values of price elasticity of demand affect total expenditure**

Price elasticity of demand can be elastic (>1), unit elastic ($=1$) or inelastic (<1).

If price rises and demand is elastic, the decrease in quantity demanded exceeds the increase in price, and total revenue will fall.

If demand is unit elastic, the decrease in quantity demanded will equal the increase in price, and total revenue will not change.

If demand is inelastic, the decrease in quantity demanded will be less than the increase in price, and total revenue will increase.

And vice versa for all cases.

QUESTION (20 marks – 5 marks per part)

2

Provide a value and explanation for each of the following. Be sure to note if these products are complements, substitutes or unrelated in your explanation. .

- a. An increase in the price of chicken from \$1.50 to \$2.10 per pound increased the average packages of turkey demanded per week from 300 to 360. Assuming that all other economic variables were held constant, the cross-price elasticity of demand between chicken and turkey is _____ which indicates that the two goods are _____.
- b. A café observed an increase in the demand for its milk following a rise in the price of a cup of iced tea from \$1.20 to \$1.50. Assuming the cross price elasticity of demand for milk with respect to a change in the price of iced tea is +0.8, by how much (in per cent) will the demand for milk have increased?
- c. The price of good X falls by 15%. As a result, the demand for a substitute good Y rises by 30%. What is the cross-elasticity of demand for good Y with respect to good X?
- d. If the cross-price elasticity of demand for samosas and sushi is 0.6 and presently 1000 units of samosa are consumed, how many units of samosas will be consumed if the price of sushi increases by 10%?

Ques / (You E may be different if you used 1st formula)

10

$$a) \quad \Delta P = +.60 \quad \Delta Q = +60$$
$$\text{AVG } P = 1.80 \quad \text{AVG } Q = 330$$

$$E = \frac{60/330}{.60/1.80} = \frac{.1818}{.3333} = \underline{+0.5454}$$

∴ SUBSTITUTES

$$b) \quad \Delta P = +.30 \quad \Delta Q = ? \text{ OF MILK}$$
$$\text{AVG } P = 1.35 \quad \text{GIVEN CROSS P ELASTICITY OF } D = +.8$$

$$\frac{\frac{\Delta Q}{\text{AVG } Q}}{\frac{\Delta P}{\text{AVG } P}} = \frac{X}{\frac{30}{1.35}} = .8$$

$$\therefore \frac{X}{22.22} = .8$$

$$X = 17.76$$

Q8/ c) $\downarrow P \Delta = 15\%$ GOOD X

$\uparrow Q_{\Delta} = 30\%$ GOOD Y

$$\frac{\% Q_{\Delta}}{\% P \Delta} = \frac{30\%}{-15\%} = -2 \quad \therefore$$

COMPLEMENT
GOOD

d) 1% $P \uparrow$ of SUSHI $\Rightarrow .6\%$ $\uparrow Q_{\Delta}$ of SAMOSAS

$\therefore 10\%$ $P \uparrow$ of SUSHI $\Rightarrow 6\%$ $\times 1000$ SAMOSA \uparrow
OR 60 UNIT \uparrow

$\therefore P \uparrow \Rightarrow$ TOTAL QUANTITY
10% DEMANDED OF
1060 UNITS OF SAMOSAS
(OR 60 UNIT Δ)

4

QUESTION (20 points) 5 per part

- a) Find and explain the price elasticity of demand using the midpoint method if chocolate bars price increases from \$0.85 to \$0.95 and causes a consumption decreases from 450,000 unit to 350,000 per month.
- b) Find and explain the price elasticity of demand using the point average method if price increases from \$0.85 to \$0.95, causes a consumption decreases from 450,000 unit to 350,000 per month.
- c) Find and explain the price elasticity of demand using the point average method if price decreases from \$0.95 to \$0.85, causes a consumption decreases from 350,000 unit to 450,000 per month.
- d) Explain any difference you see in the above three questions... even though they are all the same values!

Q2

4

$$a) \begin{array}{l} \uparrow P \Delta = .85 - .95 \quad \text{AVG } P = .90 \quad \Delta P \text{ price} = .10 \\ \downarrow Q \Delta = 450 \rightarrow 350 \quad \text{AVG } Q = 400 \quad \Delta \text{ QUANTITY} = 100 \end{array}$$

$$\frac{\Delta Q \%}{\Delta P \%} = \frac{\frac{\Delta Q}{\text{AVG } Q}}{\frac{\Delta P}{\text{AVG } P}} = \frac{\frac{-100,000}{400,000}}{\frac{.1}{.90}} = 2.25$$

(MIDPOINT)
ARC FORMULA

b) USE FORMULA OF

$$\epsilon = \frac{\Delta Q}{Q} / \Delta P / P \quad \text{OR} \quad \frac{P}{Q} * \frac{1}{\text{slope}}$$

$$\epsilon = \frac{100,000}{350,000} / \frac{.10}{.95} = \frac{.2857}{.1053} = \underline{\underline{2.71}}$$

PT FORMULA

c) OPPOSITE DIRECTION

$$\begin{array}{l} P \Delta \quad .95 \rightarrow .85 \quad + \quad Q \Delta \uparrow \quad 350,000 \rightarrow 450,000 \\ \Delta = .10 \quad \quad \quad \Delta = 100,000 \\ P = .85 \quad \quad \quad Q = 450,000 \end{array}$$

$$\epsilon = \frac{100,000}{450,000} / \frac{.10}{.85} = \underline{\underline{1.88}}$$

d) The more accurate method is part a to use the arc or midpoint.

QUESTION (5 marks)

4

The price elasticity of demand for wheat is -0.42 . A dry season cuts the supply of wheat. What will happen to the farmers' total revenue?

- A) The total revenue will increase.
- B) The total revenue will not change.
- C) The total revenue will decrease.
- D) There is not enough information to determine what happens to the total revenue.

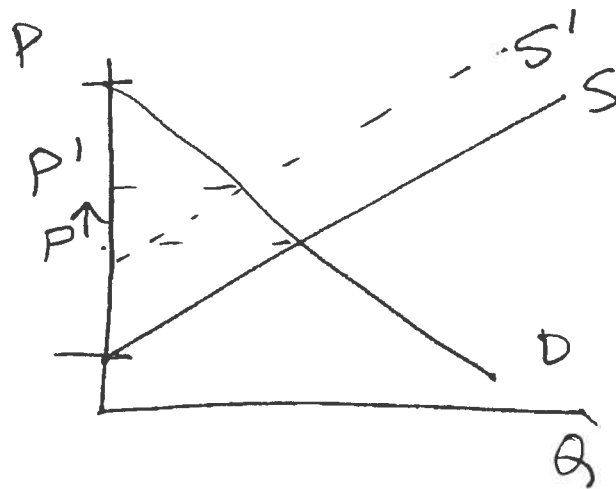
Select and explain your answer. Be sure you include a well-labeled graph (and shifting if applicable) in your explanation plus 2 or 3 reasons/examples why this would occur. *Hint: there are two things going on here... supply shifts and demand response.*

QUESTION 4/

6

$$\text{PRICE ELAST} = -0.42$$

A 1% Δ of PRICE RESULTS IN A 0.42% \downarrow
IN QUANTITY DEMANDED



DRY SEASON
CAUSES S TO
 \downarrow TO S' \downarrow
P TO \uparrow TO P'

- PRICE ELASTICITY OF DEMAND IS NOT SENSITIVE ($< 1\%$) SO INELASTIC

$\therefore 1\% P \uparrow \Rightarrow Q \downarrow$ of 0.42% SO

$P \Delta > Q \Delta$ then TR \uparrow

QUESTION (10 marks – 2.5 marks per part)

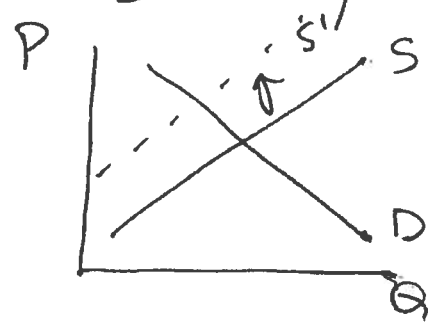
5

Using a well-labeled graph show the effect on the cheese market for each of the following. (Please also provide a brief explanation of the relationship (e.g., positive/negative) and the reasons/logic for the relationship.)

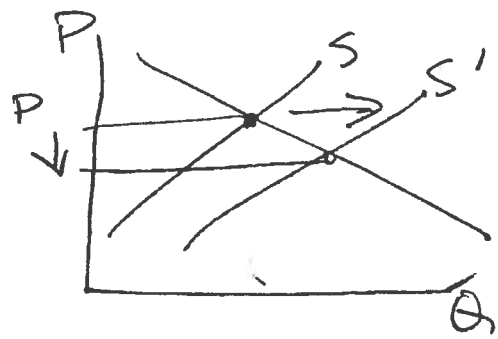
- A) an increase in the price of the milk used to produce cheese
- B) an increase in the number of cheese manufacturers
- C) an improvement in the productivity of cheese -making machines
- D) a fall in the price of bread, a complement for cheese

Qu 5/

A) \uparrow PRICE OF MILK INPUT $\Rightarrow \uparrow$ COST OF PRODUCTION FOR CHEESE + \downarrow SUPPLY CURVE SHIFT



B) \uparrow # OF FIRMS MAKING CHEESE $\Rightarrow \uparrow$ SUPPLY SHIFT RIGHT

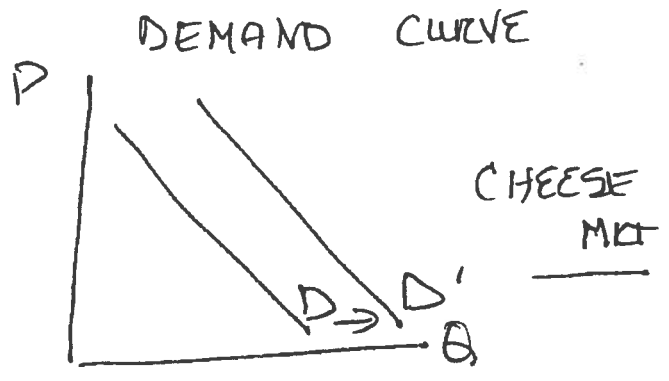
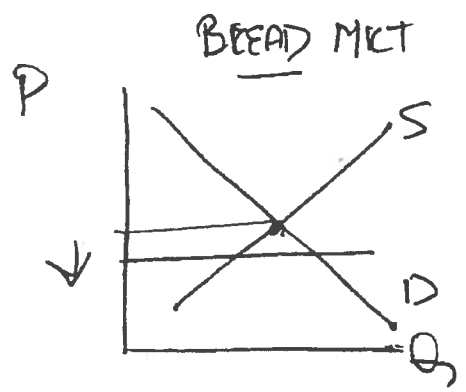


\downarrow P of cheese

C) \uparrow PRODUCTIVITY

This will be similar to cost of production as the supply will shift. In this case if technology increases productivity then the supply curve shifts rightward. More quantity available at each price.

D) \downarrow P of BREAD $\Rightarrow \uparrow$ DEMAND FOR CHEESE / SHIFT



QUESTION (10 marks – 2.5 marks per part)

4

Oatmeal is an inferior good and cold cereal is a substitute for oatmeal. The cross price elasticity of Raisin with respect to oatmeal is negative.

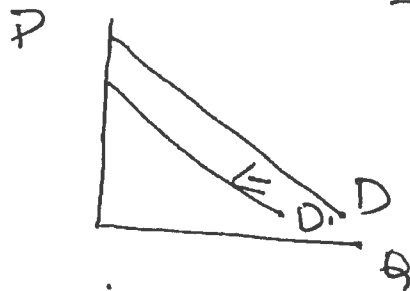
Using a well-labeled graph show the effect on the oatmeal market for each of the following. (Please also provide a brief explanation of the relationship (e.g., positive/negative) and the reasons/logic for the relationship.

- a. An increase in the price of raisins.
- b. An increase in income.
- c. A decrease in population size.
- d. An increase in the price of cold cereal

Q6 / P of RAISINS $\uparrow \rightarrow Q_D$ OF OATMEAL \downarrow ~~8~~
 \therefore COMPLEMENTS

a) \uparrow P of RAISINS

\downarrow Q_D of OATMEAL AT EACH P
 (SHIFT DEMAND) $\rightarrow D - D'$



b) \uparrow INCOME - \uparrow Q_D FOR NORMAL
 \downarrow Q_D \checkmark INFERIOR

\therefore SHIFT DEMAND CURVE DOWN $\rightarrow D \rightarrow D'$



c) \downarrow POPULATION - LESS PEOPLE TO CONSUME
 OATMEAL
 (GRAPH AS ABOVE)

d) \uparrow P of COLD CEREAL - \downarrow Q_D of COLD CEREAL
 \downarrow \uparrow Q_D of OATMEAL
 ($D \rightarrow D'$)



(SHIFT RIGHTWARDS)

QUESTION (20 marks – 5 marks per part)

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