

HW#5 Due February 25, 2021

Mankiw Page 107

3. Suppose the price elasticity of demand for heating oil is 0.2 in the short run and 0.7 in the long run.
- If the price of heating oil rises from \$1.80 to \$2.20 per gallon, what happens to the quantity of heating oil demanded in the short run? In the long run? (Use the midpoint method in your calculations.)
 - Why might this elasticity depend on the time horizon?

7. Suppose that your demand schedule for pizza is as follows:

Price	Quantity Demanded (income = \$20,000)	Quantity Demanded (income = \$24,000)
\$8	40 pizzas	50 pizzas
10	32	45
12	24	30
14	16	20
16	8	12

- Use the midpoint method to calculate your price elasticity of demand as the price of pizza increases from \$8 to \$10 if (i) your income is \$20,000 and (ii) your income is \$24,000.
- Calculate your income elasticity of demand as your income increases from \$20,000 to \$24,000 if (i) the price is \$12 and (ii) the price is \$16.

3) **Short run**

η_D : Percent change \div Percent change in price

$$0.2 = \frac{\% \Delta Q_D}{\left(\frac{2.2 - 1.8}{2} \right)}$$

\therefore Quantity demand decrease by 4%, due to the law of demand

$$0.2 = \frac{\% \Delta Q_D}{\frac{0.4}{2}}$$

$$0.2 = \frac{\% \Delta Q_D}{0.2}$$

$$\% \Delta Q_D = 0.04$$

Long Run

η_D : Percent change in $Q_D \div$ % Change in price

$$0.7 = \frac{\% \Delta Q_D}{\left(\frac{2.2 - 1.8}{2} \right)}$$

\therefore The quantity demand decreases by 14%.

$$0.7 = \frac{\% \Delta Q_D}{\frac{0.4}{2}}$$

$$\% \Delta Q_D = 0.14$$

B) \therefore Elasticity depends on another product or materials that can be substitute. Substitutes also depend on time horizon, if their is more time available their will be more opportunity

7) i) $\epsilon_D = \%$ change in quantity demanded \div $\%$ change in price

$$= \frac{\frac{38-40}{\frac{32+40}{2}} \cdot 36}{\frac{10-8}{\frac{10+8}{2}} \cdot 9}$$

$$= \frac{-0.22}{0.22}$$

$$= -1 \#$$

ii) $\eta_D = \%$ change in quantity demanded \div $\%$ change in price

$$= \frac{\frac{45-50}{\frac{45+50}{2}}}{\frac{10-8}{\frac{10+8}{2}}}$$

$$= \frac{-\frac{2}{19}}{\frac{2}{9}}$$

$$= -0.474 \#$$

b) i)

$\epsilon_D = \%$ change in quantity demanded \div $\%$ change in price

$$= \frac{\frac{30-29}{29}}{\frac{24000-20000}{20000}}$$

$$= \frac{0}{4} \#$$

b) ii)

$\epsilon_D = \%$ change in quantity demanded \div $\%$ change in price

$$= \frac{\frac{12-8}{8}}{\frac{24000-20000}{20000}}$$

$$= \frac{3}{2} \#$$

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