

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?

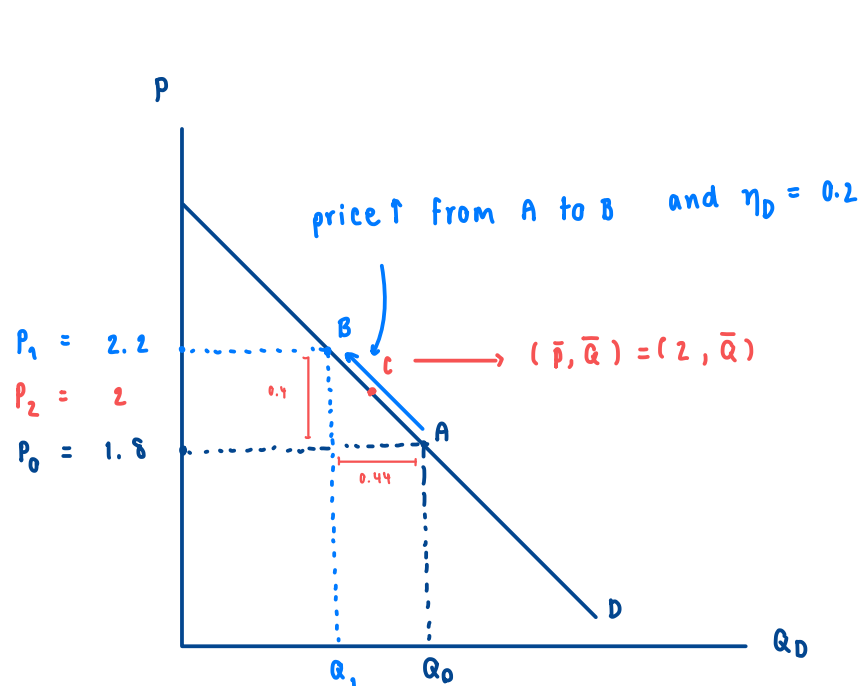
7. Suppose that your demand schedule for pizza is as follows:

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. Suppose the price elasticity of demand for heating oil is 0.2 in the short run and 0.7 in the long run.

- a. 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.)



short-run

Arc Elasticities by midpoint method

$$\eta_D = \frac{\text{percentage change in quantity demand}}{\text{percentage change in price}}$$

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

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

$$\% \Delta Q_D = 0.04$$

$\therefore$ The quantity demand decreased by 4% the reason that it decrease due to the law of demand.

$$\begin{aligned} \eta_D &= 0.2 \\ P_0 &= 1.8 \\ P_1 &= 2.2 \\ P_2 &= 2 \end{aligned}$$

Long - run

$$\eta_D = \frac{\text{percentage change in quantity demand}}{\text{percentage change in price}}$$

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

$$\% \Delta Q_D = 0.14$$

$\therefore$ The quantity demand decreased by 14%.

in long-run situation .

(b) Price elasticity depends on how many will be the substitutes. More time means that consumers can wait until get a better substitute. So this is why price elasticity is depend on time horizon .

- a. 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.
- b. 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.

$$7. a. \quad \eta_D = \frac{\text{percentage change in quantity demand}}{\text{percentage change in price}}$$

(i)

$$= \frac{\frac{32-40}{\frac{32+40}{2}}}{\frac{10-8}{\frac{10+8}{2}}}$$

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

$$= -1 \text{ ans}$$

$$(ii) \quad \eta_D = \frac{\text{percentage change in quantity demand}}{\text{percentage change in price}}$$

$$= \frac{\left(\frac{45-50}{\frac{45+50}{2}} \right)}{\left(\frac{10-8}{\frac{10+8}{2}} \right)} = -0.474 \text{ ans}$$

(i)

$$7. b \quad \eta_I = \frac{\% \Delta Q_D}{\% \Delta I}$$

$$= \frac{\frac{30-24}{24}}{\frac{24000-20000}{20000}}$$

$$= \frac{5}{4} \text{ or } 1.25 \text{ ans}$$

$$(ii) \quad \eta_I = \frac{\% \Delta Q_D}{\% \Delta I}$$

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

$$= \frac{5}{2} \text{ or } 2.5 \text{ ans}$$