HW#7 Due Feb 15, 2022

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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.)

   b. 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

   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.

3) In short run : $m = 0.2$

In long run : $m = 0.7$

Heating oil price rises from $1.80 to $2.20

a) Quantity demand changes (Midpoint method)

Short run

$$\eta_D = \frac{\%\Delta Q}{\%\Delta P}$$

$$0.2 = \frac{\%\Delta Q}{\frac{P_1 + P_2}{2}}$$

$$0.2 = \frac{\%\Delta Q}{\frac{1.8 + 2.2}{2}}$$

$$(0.2)(2) = \%\Delta Q$$

$$\%\Delta Q = 0.4$$

Long run

$$\eta_D = \frac{\%\Delta Q}{\%\Delta P}$$

$$0.7 = \frac{\%\Delta Q}{\frac{P_1 + P_2}{2}}$$

$$0.7 = \frac{\%\Delta Q}{\frac{1.8 + 2.2}{2}}$$

$$\%\Delta Q = 1.4$$

b) Elasticity depends on time horizon

The elasticity depends on time horizon because in the short run when price increases people don't have many substitute to choose which is in elastic in price, but when time has passed or in the long run there will be more substitutes for people to chouse and price will be now more elastic.

7a. Midpoint method → $\frac{1}{\text{slope}} \cdot \frac{P_1+P_2}{Q_1+Q_2}$

i) slope = $\frac{8-10}{40-32} = \frac{(-2)}{8} = -\frac{1}{4}$

→ $\frac{1}{\text{slope}} \cdot \frac{8+10}{40+32}$

→ $-4 \cdot \frac{18}{72}$

$\eta_D = -1$

ii) slope = $\frac{8-10}{50-45} = \frac{-2}{5} = -0.4$

→ $\frac{1}{\text{slope}} \cdot \frac{8+10}{50+45}$

→ $-\frac{5}{2} \cdot \frac{18}{95}$ $\frac{9}{19}$

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

(i) $\eta_I = \frac{\%.\Delta Q_D}{\%.\Delta I}$

$\eta_I = \frac{\frac{30-24}{24}}{\frac{25000-20,000}{20000}} \cdot \frac{\frac{1}{4}}{\frac{1}{5}} = \frac{5}{4} = 1.25\%$

$\eta_I = \frac{5}{4} \approx 25\%$

ii) $\eta_I = \frac{\%.\Delta Q}{\%.\Delta I}$

$= \frac{\frac{12}{8}}{\frac{2}{25000-20000}} \cdot \frac{\frac{4}{2}}{\frac{5000}{20000}}$

$= \frac{5}{2} \approx 250\%$

$\eta_I = \frac{5}{2} = 250\%$