HW#7 Due Feb 15, 2022

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.

   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 : $m = 0.9$

Heating oil price rises from 1.80 $ to 2.20 $

a) Quantity demanded changes

Short run

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

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

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

$\% \Delta Q = 0.4$

Long run

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

$$0.9 = \frac{\% \Delta Q}{\frac{P_1 + P_2}{2}}$$

$$0.9 = \frac{\% \Delta Q}{\frac{1.8+2.2}{2}}$$

$\% \Delta Q = 1.4$

b) The elaticity depends on time horizon became in the short run when price increase people don't have money substitute to choose whice is in elatic in price

7a

Mid point method → $\frac{1}{\text{slope}} \cdot \frac{P_1 + P_2}{Q_1 + Q_2}$

(i) slope $= \frac{8-10}{40-32} = \frac{-2}{8} = \frac{-1}{4}$ (as income 20,000 $)

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

→ $-4 \cdot \frac{18}{72}$

$n_D = -1$

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

mid point $= \frac{-5}{2} \cdot \frac{8+10}{50-45}$

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

7b

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

$$n_I = \frac{\frac{30-24}{24}}{\frac{24,000-20,001}{20,000}} = \frac{\frac{1}{4}}{\frac{1}{5}} = 1.25\%$$

$n_I = \frac{5}{4} = 25\%$

(ii) $n_I = \frac{\% \Delta Q}{\% \Delta I}$

$$= \frac{\frac{12-8}{8}}{\frac{24000-20000}{20000}} = \frac{5}{2} = 250\%$$

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