HW#5 Due September 22, 2020

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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.

32.)

elasticity 的公式 midpoint method $\dfrac{(Q_2 - Q_1)/[(Q_2 + Q_1)/2]}{(P_2 - P_1)/[(P_2 + P_1)/2]}$

$$0.2 = \frac{X}{\frac{(2.2-1.8)}{\frac{(2.2+1.8)}{2}}} = \frac{X}{\frac{0.4}{2}} = \frac{X}{0.2}$$

short run

$X = 0.04$

X = % change in quantity demaned in short run.

longrun

$$0.7 = \frac{X}{\frac{(2.2-1.8)}{\frac{(2.2+1.8)}{2}}} = \frac{X}{\frac{0.4}{2}} = \frac{X}{0.2}$$

$X = 0.14$

% change in quantity demaned in long run.

3b) In short run, when the oil price rise, people can't adapt to this change effectively – as the price elasticity of demand show that it is 0.04 which is very inelastic. But in long run, people can change their behavior and can adapt to this change. For example, they can use fuel-efficient car instead, or they can rely on public transportation. So, the price elasticity of demand is 0.14 (more than in short run) according to the capacity of adaptation and alternative.

72. (i) income is 20,000

$$\frac{(Q_2 - Q_1)/[(Q_2 + Q_1)/2]}{(P_2 - P_1)/[(P_2 + P_1)/2]}$$

①	8	40
②	10	32

$$= \frac{(32-40)/(32+40)}{(10-8)/(10+8)}$$

$$= \frac{-8/72}{2/18} = \frac{-0.11}{0.11} = |-1| = 1 \text{ unit elasticity}$$

(ii) income is 24,000

①	8	50
②	10	45

$$= \frac{(45-50)/(45+50)}{(10-8)/(10+8)}$$

$$= \frac{-5/95}{2/18} \approx \frac{-0.053}{0.11} \approx |-0.478| \approx 0.478$$

inelastic

7b.) income increases from 20,000 to 24,000

(i) the price is $12

$$\text{income elasticity} = \frac{(30-24)\div 24}{(24k-20k)\div 20k} = \frac{0.25}{0.2} = 1.25$$

elastic

(ii) the price is $16

$$\text{income elasticity} = \frac{(12-8)\div 8}{(24k-20k)\div 20k} = \frac{0.5}{0.2} = 2.5$$

elastic