HW#5 Due February 25, 2021

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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. a) Short run
(midpoint method)

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

$$n_D = \frac{\frac{Q_1 - Q_2}{\frac{Q_1 + Q_2}{2}}}{} \cdot \frac{\frac{P_1 + P_2}{2}}{P_1 \cdot P_2}$$

$$n_D = \% \Delta Q \cdot \frac{\frac{P_1 + P_2}{2}}{P_1 - P_2}$$

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

$$0.2 = \% \Delta Q \cdot 5$$

$$\% \Delta Q = 0.04$$

∴ In short run, due to the price elasticity of demand, the quantity of heating oil demanded decrease by 4%.

long run
(midpoint method)

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

$$n_D = \frac{Q_1 - Q_2}{\frac{Q_1 + Q_2}{2}} \cdot \frac{\frac{P_1 + P_2}{2}}{P_1 - P_2}$$

$$n_D = \% \Delta Q \cdot \frac{\frac{P_1 + P_2}{2}}{P_1 - P_2}$$

$$n_D = \% \Delta Q \cdot \frac{\frac{2.2 + 1.8}{2}}{2.2 - 1.8}$$

$$\% \Delta Q = 0.14$$

∴ In long run, due to price elasticity of demand, the quantity of heating oil demanded decreases by 14%.

36) The elasticity is depended on the other substitutes. For this incident, the more time it happens, the more substitutes you can find. Therefore, this is a reason for why the elasticity depends on the horizon.

7. a) i) $n_D = \frac{\%\Delta Q}{\%\Delta P}$

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

$n_D = -1$

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

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

$n_D = -0.474$

7. b) i) $n_i = \frac{\%\Delta Q}{\%\Delta I}$

$$n_i = \frac{\frac{30-24}{24}}{\frac{24000-20,000}{20,000}}$$

$\therefore n_i = 1,25 \times 1$

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

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

$n_i = 2,5$