

HW#5 Due September 22, 2020

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.

(a)

3. midpoint method : $\frac{\text{end value} - \text{start value}}{\text{midpoint}}$

$$: \frac{2.20 - 1.8}{\frac{(2.2 - 1.8)}{2}}$$

$$: 0.2 \times 100$$

$$: 20 \%$$

• short run : 0.2

$$: 0.2 \times 0.2$$

$$: 4 \%$$

• long run : 0.2 x 0.7

$$: 14 \%$$

(b) because customers can change the price in long run easier than short run.

7. a) ⁽ⁱ⁾ $\eta_D = \frac{Q_1 - Q_0}{Q_1 + Q_0} \cdot \frac{P_1 + P_0}{P_1 - P_0}$

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

$$= \frac{-8}{72} \cdot \frac{18}{2}$$

$$= -1 \times$$

⁽ⁱⁱ⁾ $\eta_D = \frac{Q_1 - Q_0}{Q_1 + Q_0} \cdot \frac{P_1 + P_0}{P_1 - P_0}$

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

$$= \frac{-5}{95} \cdot \frac{18}{2}$$

$$= \frac{-90}{190}$$

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

b) ⁽ⁱ⁾ $\eta_D = \frac{\% \Delta Q}{\% \Delta P} = \frac{(Q_1 - Q_0)/Q_0 \cdot 100}{(P_1 - P_0)/P_0 \cdot 100}$

$$= \frac{8 - 24}{24} \cdot \frac{12}{16 - 12}$$

$$= -2 \times$$

⁽ⁱⁱ⁾ $\eta_D = \frac{\% \Delta Q}{\% \Delta P} = \frac{(Q_1 - Q_0)/Q_0 \cdot 100}{(P_1 - P_0)/P_0 \cdot 100}$

$$= \frac{12 - 30}{30} \cdot \frac{12}{16 - 12}$$

$$= \frac{-9}{5} \times$$