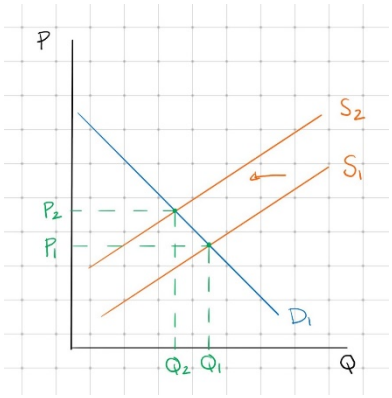
Week 4 Discussion Section – Solutions

Part 1: Revenue and Price Elasticity of Demand

Tea and (English) biscuits are complements. Both have inelastic demand. A flood destroys half the tea crop in India. Use appropriate diagrams to answer the following questions.

1. What happens to the price of tea?



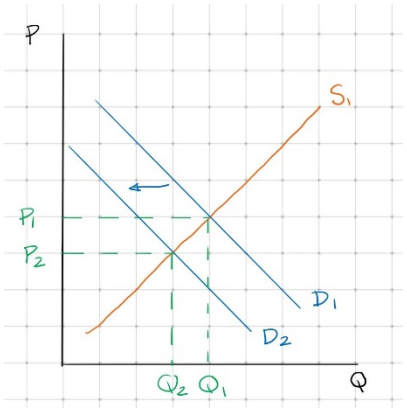
There is a decrease in the supply of tea.

This causes an increase in the equilibrium price.

2. What happens to total expenditure on tea? Explain.

When the price of tea increases, total expenditure on tea will increase as well. This is because demand for tea is inelastic. The increase in price is met with a weak decrease in quantity demanded, and the overall spending on tea $(price \times quantity)$ will rise.

3. What happens to the price of biscuits?



There is a decrease in the demand for biscuits because the price of a complement (tea) has risen.

This causes a decrease in the equilibrium price.

4. What happens to the total expenditure on biscuits? Explain.

When the price of biscuits decreases, total expenditure on biscuits will decrease as well. This is because demand for biscuits is inelastic. The decrease in price is met with a weak increase in quantity demanded, and the overall spending on biscuits $(price \times quantity)$ will fall.

Part 2: The Midpoint Method

Consider the markets for mobile and landline telephone service. Suppose that when the average income of residents of Plainville is $54,000 per year, the quantity demanded of landline telephone service is 13,000 and the quantity demanded of mobile service is 28,000. Suppose that when the price of mobile service rises from $100 to $120 per month, the quantity demanded of landline service decreases to 11,000 and the quantity demanded of mobile services decreases to 26,000. Suppose also that when the average income increases to $60,000, the quantity demanded of mobile service increases to 32,000.

5. Using the midpoint method, what is the income elasticity of demand for mobile service?

$$Q_1 = 28000, \quad Q_2 = 32000$$
$$I_1 = 54{,}000, \quad I_2 = 60{,}000$$

$$\%\ change\ in\ Q = \frac{32000 - 28000}{(28000 + 32000)/2} \times 100\% = 13.3\%$$

$$\%\ change\ in\ I = \frac{60000 - 54000}{(60000 + 54000)/2} \times 100\% = 10.5\%$$

$$\text{Elasticity} = \frac{13.3\%}{10.5\%} = 1.3$$

6. Considering the income elasticity, what type of good is mobile telephone service? Explain.

   Mobile telephone service is a normal good because the income elasticity of demand is positive.

7. Using the midpoint method, what is the cross-price elasticity of demand for landline and mobile service?

$$Q_1 = 13000, \quad Q_2 = 11000$$
$$P_1 = 100, \quad P_2 = 120$$

$$\%\ change\ in\ Q = \frac{11000 - 13000}{(11000 + 13000)/2} \times 100\% = -16.7\%$$

$$\%\ change\ in\ P = \frac{120 - 100}{(120 + 100)/2} \times 100\% = 18.2\%$$

$$\text{Elasticity} = \frac{-16.7\%}{18.2\%} = -0.92$$

8. Considering the cross-price elasticity of demand for mobile and landline telephone service, do the consumers of Plainville regard these goods as substitutes or complements? Explain.

   Consumers must regard these goods as complements, since the cross-price elasticity of demand is negative.

Part 3: Price Elasticity of Demand

Adam and Barb go to the store to purchase some lottery tickets. Without looking at the price, Adam says "I'll take 10 lottery tickets," and Barb says "I'll take $10 worth of lottery tickets."

9. What is Adams's price elasticity of demand for lottery tickets?

   Perfectly inelastic - Note that when demand is perfectly inelastic a change in price results in no change in quantity demanded.

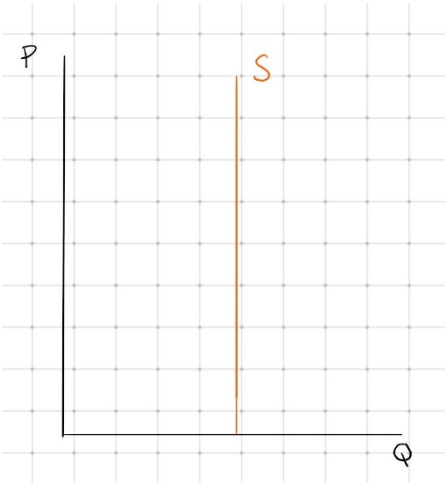
10. What is Barb's price elasticity of demand for lottery tickets?

    Unit elastic - Note that when demand is unit elastic a change in price results in no change in expenditure (aka the same level of spending)

Part 4: Price Elasticity of Supply

Consider the market for original paintings by the deceased artist Vincent Van Gogh.

11. Draw the supply curve for this market, making sure to think about the price elasticity of supply in this market.



Supply is perfectly inelastic because there is a fixed number of paintings

12. Suppose there is a decrease in demand for Van Gogh paintings. Determine the impact this will have on the equilibrium price and quantity. Explain.

    Price will fall and quantity will be unaffected (since there is a limited number of paintings in the world).