

ECON 1020: Principles of Microeconomics

Homework 3: Chapters 4–5

The Market Forces of Supply and Demand & Elasticity and Its Application

Due on Monday, October 5 at 12:20 PM

Submissions are accepted either online through NTU COOL or as a hard copy at your recitation session.

Part A: The Market Forces of Supply and Demand

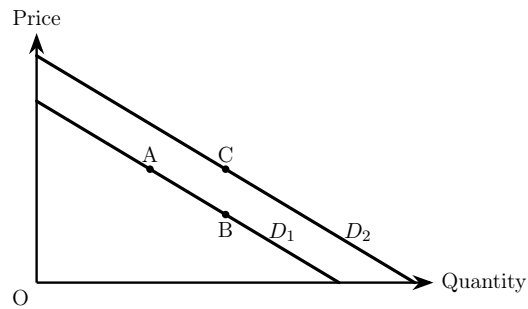
1. The market for bottled water has four suppliers. The table below shows the number of cases each is willing to sell per week at various prices.

Price (NT\$ per case)	Alpine	Brook	Cascade	Dew Good
300	100	40	60	100
600	200	80	120	200
900	300	120	180	300

- (a) What is the market quantity supplied when the price is NT\$600 per case?
- (b) Assume the linear supply relationship in the table holds at all nonnegative prices, so market supply is $Q_S = P$, with P in NT\$ per case and Q_S in cases per week. If market demand is $Q_D = 1,000 - P$, what is the equilibrium price and quantity?
- (c) At prices of NT\$600 and NT\$400, identify the shortage or surplus and its size. Which way would price tend to move if it can adjust freely?
- (d) Draw the market supply and demand curves from part (b), with bottled water (cases per week) on the horizontal axis and price (NT\$ per case) on the vertical axis. Mark the equilibrium and label its price and quantity. Draw a horizontal line at NT\$600, label the quantities demanded and supplied there, and mark the surplus on your graph.

2. Suppose the demand for bubble tea and the supply of bubble tea both increase at the same time. Assume downward-sloping demand and upward-sloping supply.
- (a) Using the three-step method from class, explain what happens to equilibrium price and quantity. Which change can we determine for certain?
- (b) Draw two separate supply-and-demand diagrams. In the first, show both curves shifting so that equilibrium price rises; in the second, show both shifting so that equilibrium price falls. Label the axes, D_1 , D_2 , S_1 , S_2 , and the old and new equilibria. Use dashed guides to show the changes in price and quantity. Explain why your two diagrams support your answer to part (a). Exact numbers are not required.

3. The figure below shows two demand curves, D_1 and D_2 , for a good, along with three points A, B, and C.



Treat each scenario separately. Identify the movement between the labeled points (e.g. “A to B”). For a demand shift, compare quantities at the same price; for an own-price change, stay on the same curve. Hold other demand determinants fixed.

- (a) Consumer incomes increase, and this good is an inferior good.
- (b) The price of a substitute for this good rises.
- (c) The price of this good itself increases.
- (d) The good can be stored, and buyers expect its price to rise next week.

Part B: Elasticity and Its Application

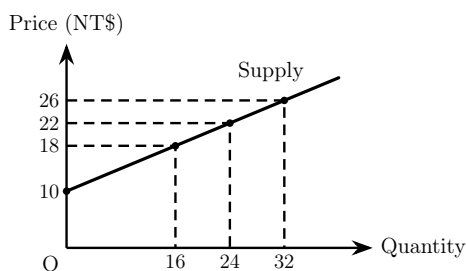
4. The table below is the market demand schedule for a good.

Price (NT\$)	Quantity demanded
0	150
40	110
60	90
90	60
110	40

- (a) Using the midpoint method, what is the price elasticity of demand between NT\$40 and NT\$60? Is demand elastic or inelastic over this range?
- (b) Using the midpoint method, what is the price elasticity of demand between NT\$90 and NT\$110? Is demand elastic or inelastic over this range?
- (c) Between which two adjacent prices in the table is the midpoint price elasticity of demand exactly 1? Compare total revenue at those two prices.
- (d) Draw the demand curve from the table, assuming it is linear between the listed points. Put quantity on the horizontal axis and price on the vertical axis, and label all five observations. In two separate copies of your graph, shade the total-revenue rectangle at NT\$60 and at NT\$90. Label the height, width, and area of each rectangle, and explain how the graphs illustrate your answer to part (c).

5. For each pair of goods, say which one you would expect to have the more price elastic demand, and explain why in one sentence.
- (a) Food in general, or bubble tea
 - (b) An electric scooter, or a Gogoro electric scooter
 - (c) Gasoline over a week, or gasoline over a year
6. Two elasticities. In each case, hold all demand determinants other than the stated income or other-good price fixed.
- (a) When the Lin family's monthly income was NT\$36,000, they ordered takeout 6 times a month. Now that their income has risen to NT\$44,000 a month, they order takeout 10 times a month. Using the midpoint method, compute the income elasticity of demand for takeout. Is takeout a normal or an inferior good for the Lins?
 - (b) In a town in Taichung, the price of Brand A pineapple cakes fell from NT\$330 to NT\$270 per box. As a result, the quantity demanded of Brand B pineapple cakes fell from 1,200 boxes to 800 boxes per week. Which elasticity is appropriate here? Compute it using the midpoint method, and say what its sign tells us about the two brands.

7. The figure below shows the supply curve for a good.



- (a) Using the midpoint method, what is the price elasticity of supply between NT\$18 and NT\$22?
- (b) Is supply elastic or inelastic over this range? Would you expect the supply of this good to be more or less elastic over a longer time horizon, and why?
8. Suppose a drought raises the cost of coffee beans used in Taiwan's convenience-store cold brew. Treat the market as competitive, with upward-sloping supply and downward-sloping demand. Hold other determinants fixed.
- (a) Which curve shifts, and in which direction? What happens to equilibrium price and quantity? A written explanation is sufficient.
- (b) Can we determine whether sellers' total revenue rises or falls? Explain separately for inelastic demand, elastic demand, and a midpoint demand elasticity of exactly one over the interval between the two equilibria.