Practice Problem Set 3

180.102 Elements of Microeconomics - TA Section 03

Pinda Wang, 13 September 2024

Part I. More problems on supply and demand

1. Without a marketplace for used furniture, college students in Liberty City had to throw away their furniture when they graduate. The emergence of a used furniture marketplace means that students can easily sell used furniture to others who need it. Noel and Liam, two students in economics, made predictions about how the used furniture marketplace will affect the market for new furniture:

   Noel: the price of new furniture will fall, because old and new furniture are substitutes, and the availability of old furniture will suppress demand for new furniture.

   Liam: the price of new furniture will rise, because people buying new furniture anticipates that they'll be able to resell it in the future. This increases the demand for new furniture.

   Which of the following statements is correct?

   A. Noel is right and Liam is wrong

   B. Liam is right and Noel is wrong

   C. Both Noel and Liam are right, so the effect on the price of new furniture is ambiguous

   D. Both Noel and Liam are wrong, because they did not consider the effect on the supply of new furniture

2. The supply for computers is given by $P = 2Q + 20$, the demand is given by $P = 80 - Q$. Answer the following questions:

   (a) Calculate the equilibrium price and quantity in the computer market.

   (b) At a price of 50, is there a surplus or shortage of computers? What is the amount of surplus/shortage?

   (c) Suppose there is technological progress in the production of computers such that for any price, the quantity supplied rises by 100%. In a supply-and-demand diagram, show how the technological progress changes the curve(s), and calculate the new equilibrium price and quantity.

Part II. Shifts in the demand curve

The following table shows Noel's demand schedule for chocolate:

Price of a bar of chocolate	\$1	\$2	\$3	\$4	\$5	\$6	\$7
Quantity demanded	7	6	5	4	3	2	1

1. Draw Noel's demand curve for chocolate.
2. Now suppose new research shows that the benefit of chocolate to human health is much greater than we thought. The textbook tells us that the demand curve shifts "to the right". Explain why an increase in demand shifts the demand curve to the right.
3. How does this new research change Noel's marginal willingness to pay for chocolates?
4. Following question (3), in which direction does the demand curve shift?
5. Does it matter whether an increase in demand shifts the demand curve rightwards or upwards?

Solutions to Practice Problem Set 3

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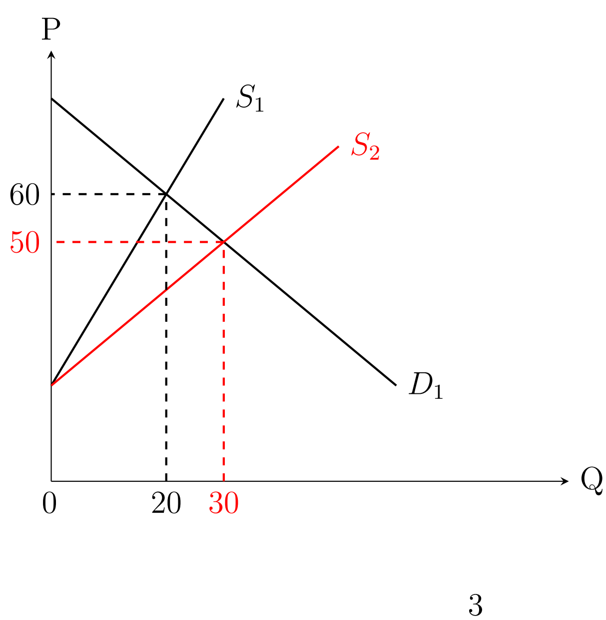
Part I. More problems on supply and demand

1. C is correct. Noel's claim is correct because old and new furniture are substitutes. The availability of a new substitute (i.e. old furniture) decreases the demand of new furniture. Liam's claim is correct because, with resale available, consumers could take this resale income into account when they decide whether to buy new furniture. It is *as if* consumers face a lower price of new furniture (note that this shifts the demand curve). We don't know the relative magnitude between the decrease and the increase in demand, so the effect on new furniture price is ambiguous.

2. (a) Solving the equations of supply and demand, we get that in equilibrium, $P = 60, Q = 20$.

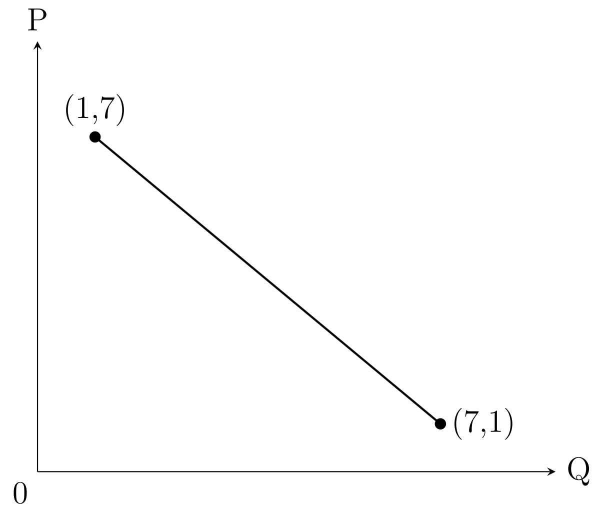
   (b) There is a shortage of computers because $P = 50$ is below the equilibrium price. At $P = 50$, the quantity supplied is 15, and the quantity demanded is 30, so there is a shortage of 15 computers.

   (c) The old supply curve is $P = 2Q + 20$, which can also be written as $Q = 0.5P - 10$. Now, new technology raises quantity supplied by 100% at each price, which means that the new supply curve should be $Q = 2 \times (0.5P - 10) = P - 20$, rewritten as $P = Q + 20$. Solving the equations of supply and demand, we get that in the new equilibrium, $P = 50, Q = 30$. See the diagram below.



Part II. Shifts in the demand curve

1. See the diagram below.



2. At any given price, buyers would like to purchase more chocolate, shifting the demand curve to the right.

3. Noel's marginal willingness to pay for chocolate increases. The new research shows that the benefit of chocolate to human health is much greater. The "value" of chocolate increases, and people are naturally willing to pay more for it.

4. The demand curve shifts upwards: for any given quantity, the buyer is willing to pay a higher price.

5. It does not matter for comparative statics. Recall that comparative statics cares only about how the new state of the economy differs from the old state; it does not care about how the economy gets there. As long as we know the position of the new demand curve, it does not matter whether the old demand curve shifted rightwards or upwards to get there.