

The Market Forces of Supply and Demand

Chapter 4

Hussain Hadah

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Introduction

Why does supply and demand matter?

- Shocks to supply and demand have big effects
 - A cold snap in Florida increases the price of oranges
 - Unrest in the Middle East increases the price of gas and the price of an F250 falls
 - A bad harvest season in Mexico will increase the price of your avocado toast
-
- **Supply and demand are two words that economists use often**
 - **They are the forces that make market economies work**
 - **They determine how much of each good is produced and at what price it ought to be sold**

Markets and Competition

What is a *market* ?

- A *market* is the collection of buyers and sellers of one specific good or service.
- Buyers determine the demand for that product and sellers determine its supply.
- Markets can be highly organized or less organized.

Farmers Market is an example of an organized market.

Buyers meet together to buy organic produce and sellers go to a farmers market to sell their goods.

The market for taco food trucks is an example of an unorganized market

People that want to buy a taco from a food truck do not all meet together. Not all food trucks go to the same place to sell as well

What is **competition**?

- The market for food truck tacos is highly competitive
- There is a taco food truck on every corner (many sellers) from which you can choose from.
- They also sell similar product, taco
- No one food truck can set the price of a taco for the whole market
- No one hungry person can set the price of a taco for the whole market
- Prices and quantities sold are determined by the interactions between buyers and sellers

A **competitive market** is a term used to describe a market with a big number of buyers and sellers. No one buyer or seller has a big impact on the market price.

In this chapter, we will assume that markets are **perfectly competitive**. For a market to be **perfectly competitive**, the following two conditions must be met:

1. The goods offered for sale are identical

2. There are so many buyers and sellers that no single buyer or seller has an influence over the market price

What is **competition**? (cont.)

- Since in a perfectly competitive market, buyers and sellers cannot influence the price, they accept the market price as given. We call buyers and sellers, in this case, *price takers*
- Can you think of a perfectly competitive market?
- The market for avocado
- Not all goods and services are sold in a perfectly competitive market.
- Some markets only have one seller that sets the price. This is called a **monopoly**.

Demand

The Demand Curve

The Relationship between Price and Quantity Demanded

- **Quantity demanded** is the amount of a good that buyers are willing and able to purchase.
- Many things can influence the quantity demanded of a good
- The good's price is the main influencer
- Quantity demanded and price have a negative relationship
- As the price of a good increases, people will buy less of it
- As the price of a good decreases, people will buy more of it
- The **law of demand**: All other things being equal, when the price of a good rise, the quantity demanded falls and *vice versa*

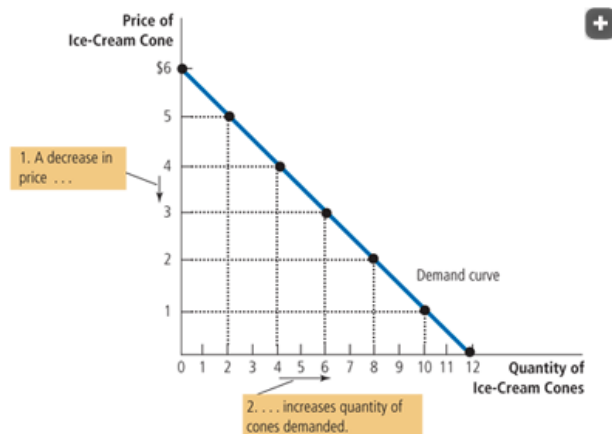
An example of a demand curve

- The figure shows Catherine's demand curve for ice-cream cones.
- The price of a good is on the y-axis and the quantity demanded is on the x-axis

Figure 1 Catherine's Demand Schedule and Demand Curve

The demand schedule is a table that shows the quantity demanded at each price. The demand curve, which graphs the demand schedule, illustrates how the quantity demanded of the good changes as its price varies. Because a lower price increases the quantity demanded, the demand curve slopes downward.

Price of Ice-Cream Cone	Quantity of Cones Demanded
\$0	12 cones
1	10
2	8
3	6
4	4
5	2
6	0



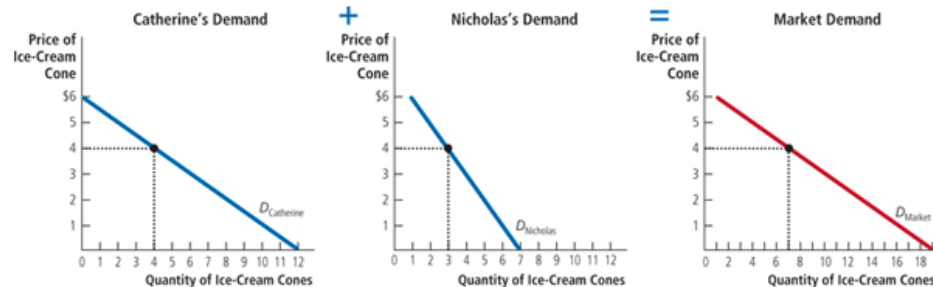
Market vs. individual demand

- Catherine's demand curve only represents the demand of one person
- To analyze the *market demand* for ice cream, we need to aggregate the demand for all individuals.

Figure 2 Market Demand as the Sum of Individual Demands

The quantity demanded in a market is the sum of the quantities demanded by all the buyers at each price. Thus, the market demand curve is found by adding horizontally the individual demand curves. At a price of \$4, Catherine demands 4 ice-cream cones and Nicholas demands 3 ice-cream cones. The quantity demanded in the market at this price is 7 cones.

Price of Ice-Cream Cone	Catherine		Nicholas		Market
\$0	12	+	7	=	19 cones
1	10		6		16
2	8		5		13
3	6		4		10
4	4		3		7
5	2		2		4
6	0		1		1

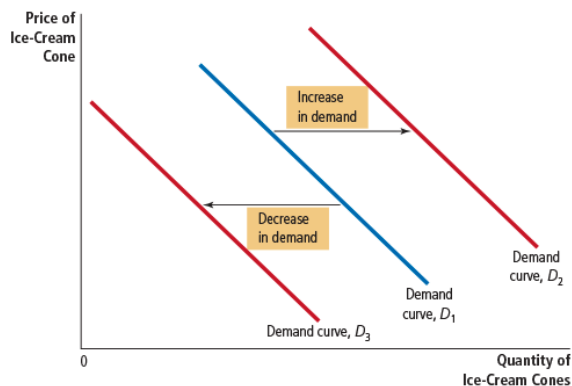


Shifts in the demand curve

- Some events might occur that would shift the demand curve
- The pandemic hit the airline industry hard
- The demand for flights plummeted because of lockdowns, which shifted the demand curve for flights
- Shocks to the demand curve change the *quantity demanded*.

Figure 3 Shifts in the Demand Curve

Any change that raises the quantity that buyers wish to purchase at any given price shifts the demand curve to the right. Any change that lowers the quantity that buyers wish to purchase at any given price shifts the demand curve to the left.



What can cause the demand curve to shift?

- Income
 1. **Normal good**: if the demand for a good increases/decreases when income increases/decreases, then the good is a normal good.
 2. **Inferior good**: If the demand for a good rises when income falls, the good is called an inferior good
- Prices of related goods
 1. Some goods are substitutes (Coke and Pepsi)
 2. Some goods are complements (Tennis balls and rackets)
- Tastes
- Expectations (Think of toilet papers before a storm)
- Number of buyers

What can cause the demand curve to shift? (cont.)

- A change in prices leads to a movement **ALONG** the demand curve (Changes in price only leads to changes to quantities demanded)
- A **SHOCK** to the demand curve changes the **demand**.

Table 1 Variables That Influence Buyers

This table lists the variables that affect how much of any good consumers choose to buy. Notice the special role that the price of the good plays: A change in the good's price represents a movement along the demand curve, whereas a change in one of the other variables shifts the demand curve.

Variable	A Change in This Variable . . .
Price of the good itself	Represents a movement along the demand curve
Income	Shifts the demand curve
Prices of related goods	Shifts the demand curve
Tastes	Shifts the demand curve
Expectations	Shifts the demand curve
Number of buyers	Shifts the demand curve

Supply

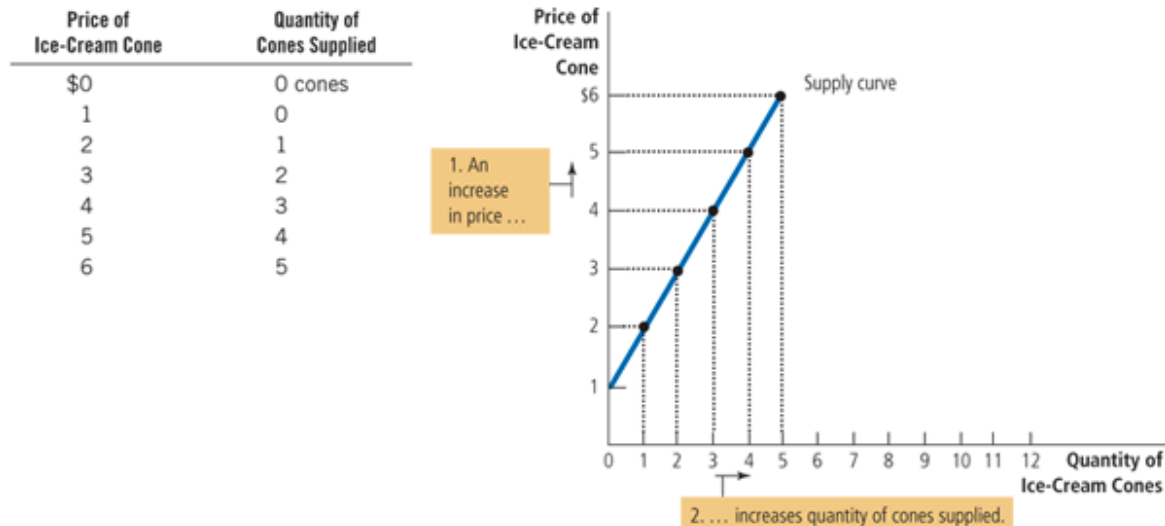
The supply curve

- **Quantity supplied** is the amount of a good that sellers are willing and able to sell
- The quantity supplied and prices have a positive relationship
- When prices fall, quantity supplied falls
- When prices rise, quantity supplied rises
- The positive relationship is called the **law of supply**

Supply curve example

Figure 5 Ben's Supply Schedule and Supply Curve

The supply schedule is a table that shows the quantity supplied at each price. This supply curve, which graphs the supply schedule, illustrates how the quantity supplied of the good changes as its price varies. Because a higher price increases the quantity supplied, the supply curve slopes upward.



Market vs. individual supply

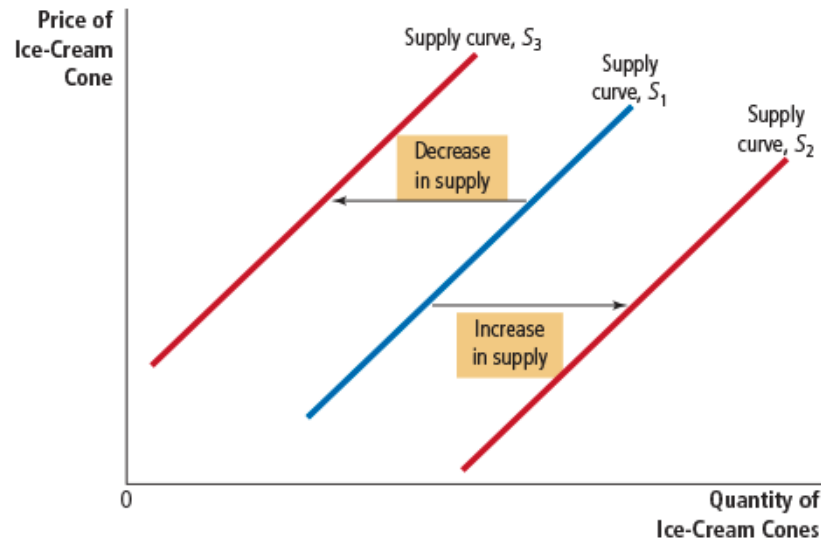
- Ben's supply curve is just the supply of one firm/person
- To analyze the market supply, we need to aggregate all suppliers

Shifts in the supply curve

- Many events could happen that would **shift** the **supply** curve

Figure 7 Shifts in the Supply Curve

Any change that raises the quantity that sellers wish to produce at any given price shifts the supply curve to the right. Any change that lowers the quantity that sellers wish to produce at any given price shifts the supply curve to the left.



What might cause a shift in the supply curve?

1. Input Prices
2. Technology
3. Expectations
4. Number of Sellers

Table 2 Variables That Influence Sellers

This table lists the variables that affect how much of any good producers choose to sell. Notice the special role that the price of the good plays: A change in the good's price represents a movement along the supply curve, whereas a change in one of the other variables shifts the supply curve.

Variable	A Change in This Variable . . .
Price of the good itself	Represents a movement along the supply curve
Input prices	Shifts the supply curve
Technology	Shifts the supply curve
Expectations	Shifts the supply curve
Number of sellers	Shifts the supply curve

Supply and Demand Together

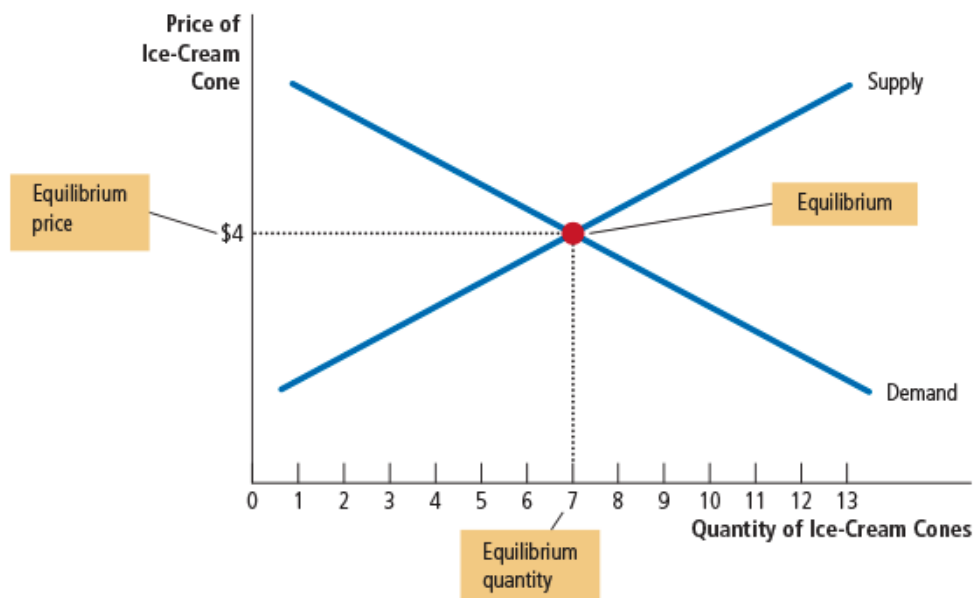
Equilibrium

- The intersection between supply and demand is called the market's **equilibrium**
- The price at the intersection is called the **equilibrium price**
- The quantity at the intersection is called the **equilibrium quantity**
- **Equilibrium price** is sometimes called the *market-clearing price*
- At the *market-clearing price*, everyone is satisfied
- People's actions in a market naturally approach the equilibrium

Graphical representation of the equilibrium

Figure 8 The Equilibrium of Supply and Demand

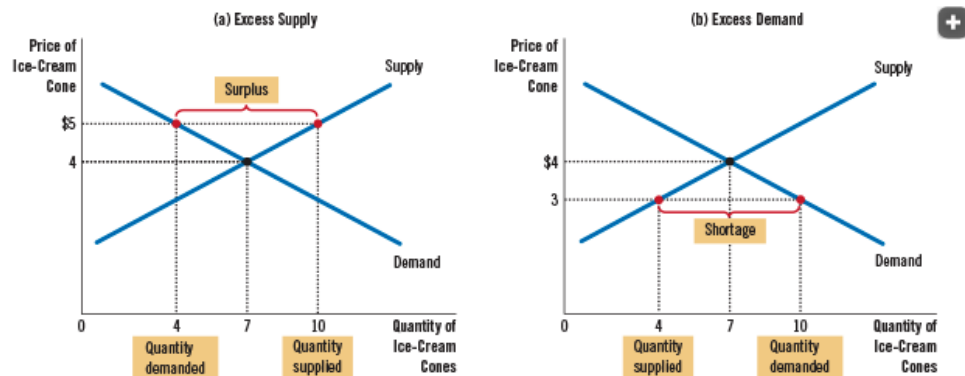
The equilibrium is found where the supply and demand curves intersect. At the equilibrium price, the quantity supplied equals the quantity demanded. Here the equilibrium price is \$4: At this price, 7 ice-cream cones are supplied and 7 ice-cream cones are demanded.



What happens if we are not at equilibrium?

Figure 9 Markets Not in Equilibrium

In panel (a), there is a surplus. Because the market price of \$5 is above the equilibrium price, the quantity supplied (10 cones) exceeds the quantity demanded (4 cones). Producers try to increase sales by cutting the price of a cone, which moves the price toward its equilibrium level. In panel (b), there is a shortage. Because the market price of \$3 is below the equilibrium price, the quantity demanded (10 cones) exceeds the quantity supplied (4 cones). With too many buyers chasing too few goods, producers can take advantage of the shortage by raising the price. Hence, in both cases, the price adjustment moves the market toward the equilibrium of supply and demand.



The law of supply and demand

In a free market, prices of goods adjust automatically to bring the quantity supplied and quantity demanded of a good to equilibrium

Analyzing changes in equilibrium

There are 3 steps to analyzing changes in equilibrium:

1. Decide whether the event shifts the supply or demand curve (or perhaps both)
2. Decide in which direction the curve shifts
3. Use the supply-and-demand diagram to see how the shift changes the equilibrium price and quantity

Example 1: a shift in demand

Suppose we had a summer that was overly hot. How does this hot summer affect the market for ice cream?

1. Hot weather changes people's taste's for ice cream (demand)

2. Hot weather makes people want to eat more ice cream. In which direction will the demand curve for ice cream shift?

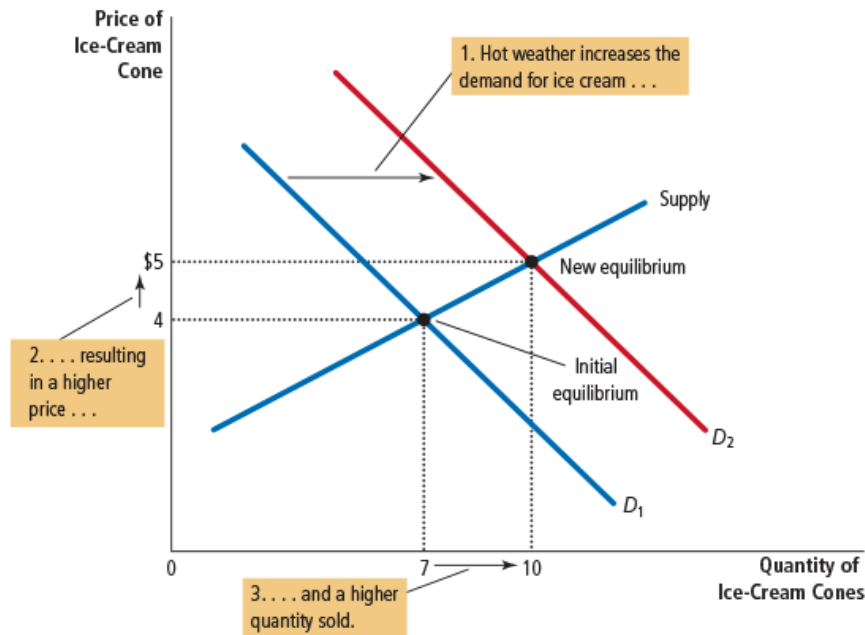
Demand curve will shift to the right

3. At the old price, firms will have more demand than supply. So they will raise the price to the new equilibrium prices

Example 1's graph

Figure 10 How an Increase in Demand Affects the Equilibrium

An event that raises quantity demanded at any given price shifts the demand curve to the right. The equilibrium price and the equilibrium quantity both rise. Here an abnormally hot summer causes buyers to demand more ice cream. The demand curve shifts from D_1 to D_2 , which causes the equilibrium price to rise from \$4 to \$5 and the equilibrium quantity to rise from 7 to 10 cones.



Shifts vs movements along curves

- Hot weather caused the demand curve to shift
- The shift in demand caused prices to rise and the quantity of ice cream to rise
- Supply curve was unchanged
- The change in weather caused the **demand** to shift
- Supply refers to the position of the demand curve
- Quantity supplied is the amount producers want to sell

Example 2: Shift to supply

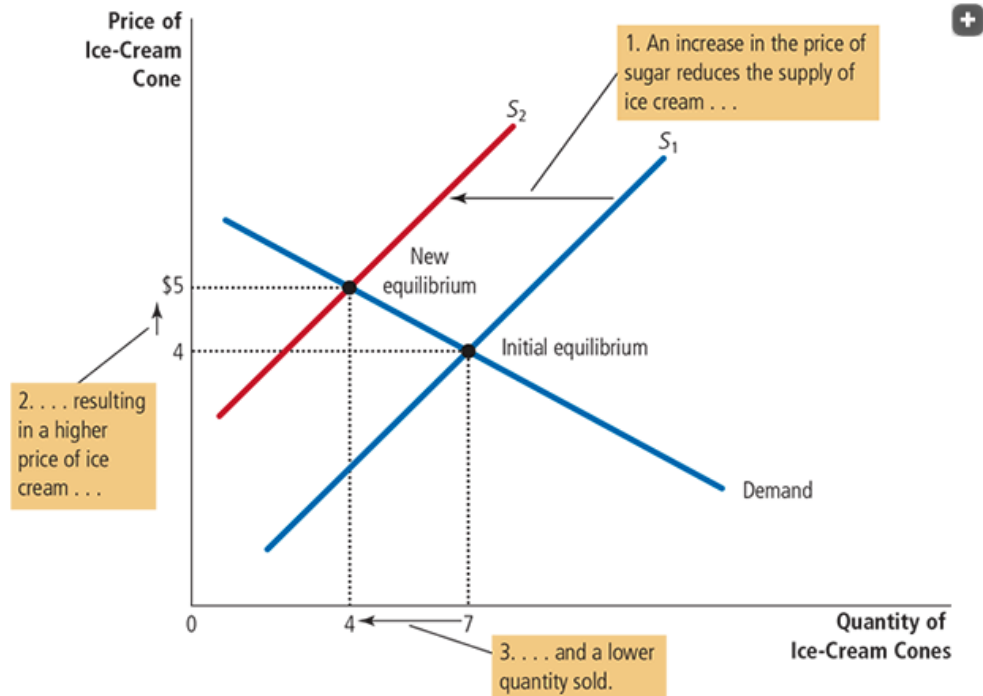
Suppose a hurricane destroys sugarcane farms, which causes the price of sugar to increase. How does this even affect the market for ice cream?

1. Sugar is an input for ice cream, so a change in the price of sugar will affect the supply curve. Higher sugar price increases the costs of production and decreases the amount of ice cream a firm will produce to sell at a given price. A change in the price of sugar has no effect on the demand curve.
2. The supply will shift to the left as a result of the sugar price increase.
3. There will be an excess demand for ice cream at the old price, which will cause shortages. Firms will increase the price of ice cream in reaction.

Example 2's graph

Figure 11 How a Decrease in Supply Affects the Equilibrium

An event that reduces quantity supplied at any given price shifts the supply curve to the left. The equilibrium price rises, and the equilibrium quantity falls. Here an increase in the price of sugar (an input) causes sellers to supply less ice cream. The supply curve shifts from S_1 to S_2 , which causes the equilibrium price of ice cream to rise from \$4 to \$5 and the equilibrium quantity to fall from 7 to 4 cones.



Example 3: shocks to supply and demand

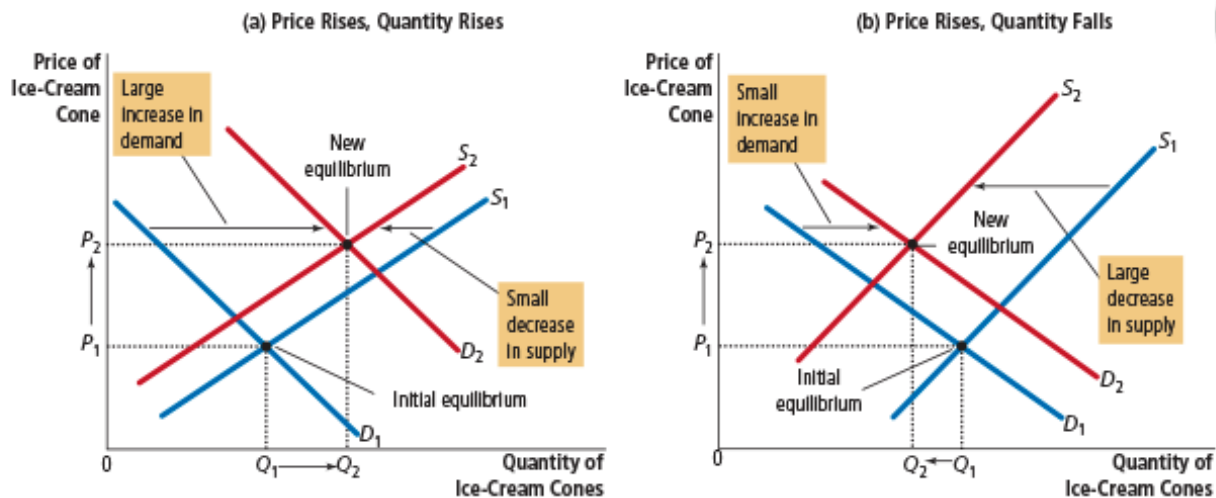
Say that the heatwave and the hurricane hit at the same time:

1. Both curves will shift.
2. The supply and demand will shift in the same direction they did in the examples before.
3. There are two possible outcomes.

Example 3's graph

Figure 12 A Shift in Both Supply and Demand

Here we observe a simultaneous increase in demand and decrease in supply. Two outcomes are possible. In panel (a), the equilibrium price rises from P_1 to P_2 , and the equilibrium quantity rises from Q_1 to Q_2 . In panel (b), the equilibrium price again rises from P_1 to P_2 , but the equilibrium quantity falls from Q_1 to Q_2 .



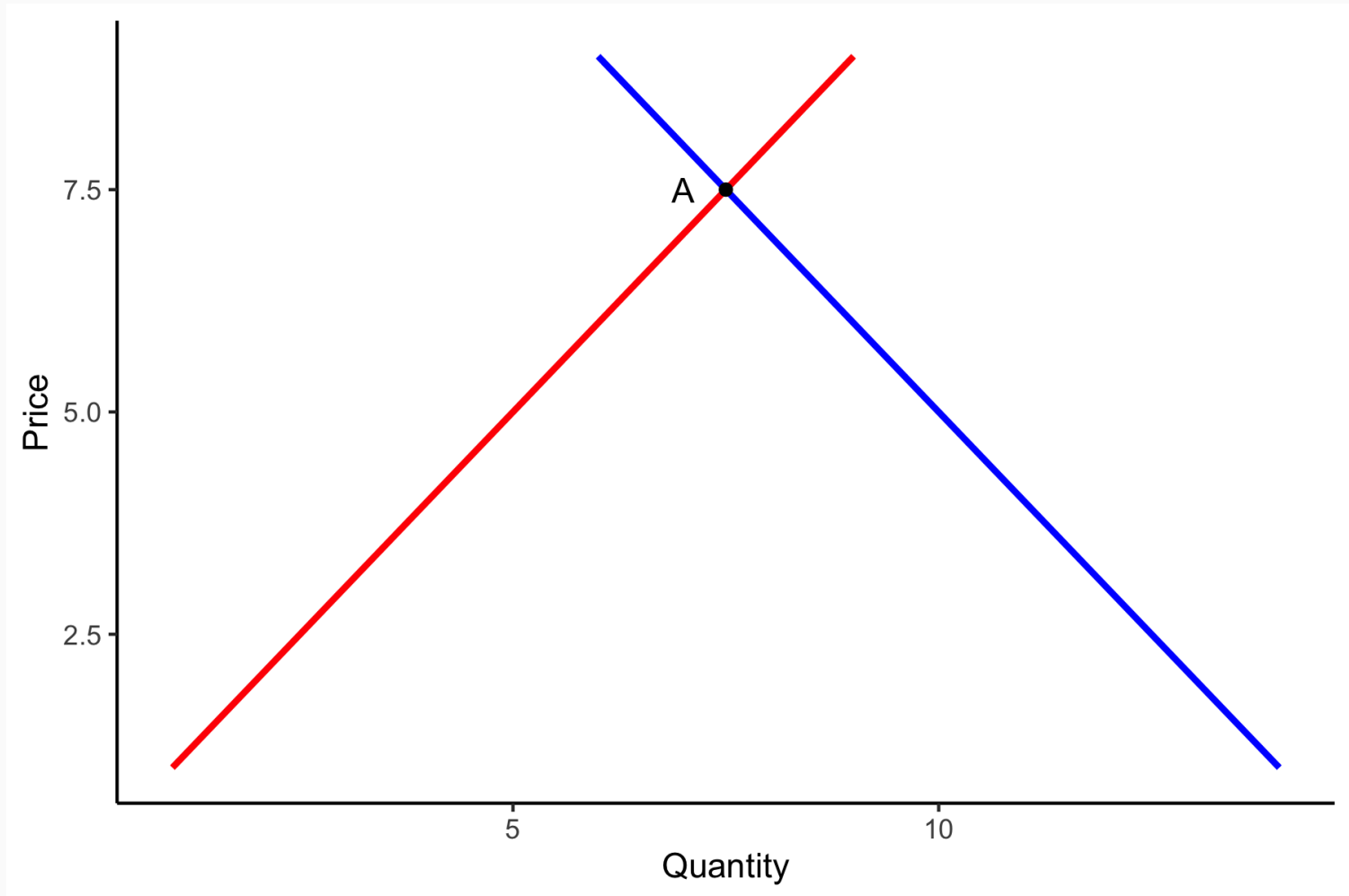
Shifts in demand and supply: Summary

Table 4 What Happens to Price and Quantity When Supply or Demand Shifts?

As a quick quiz, make sure you can explain at least a few of the entries in this table using a supply-and-demand diagram.

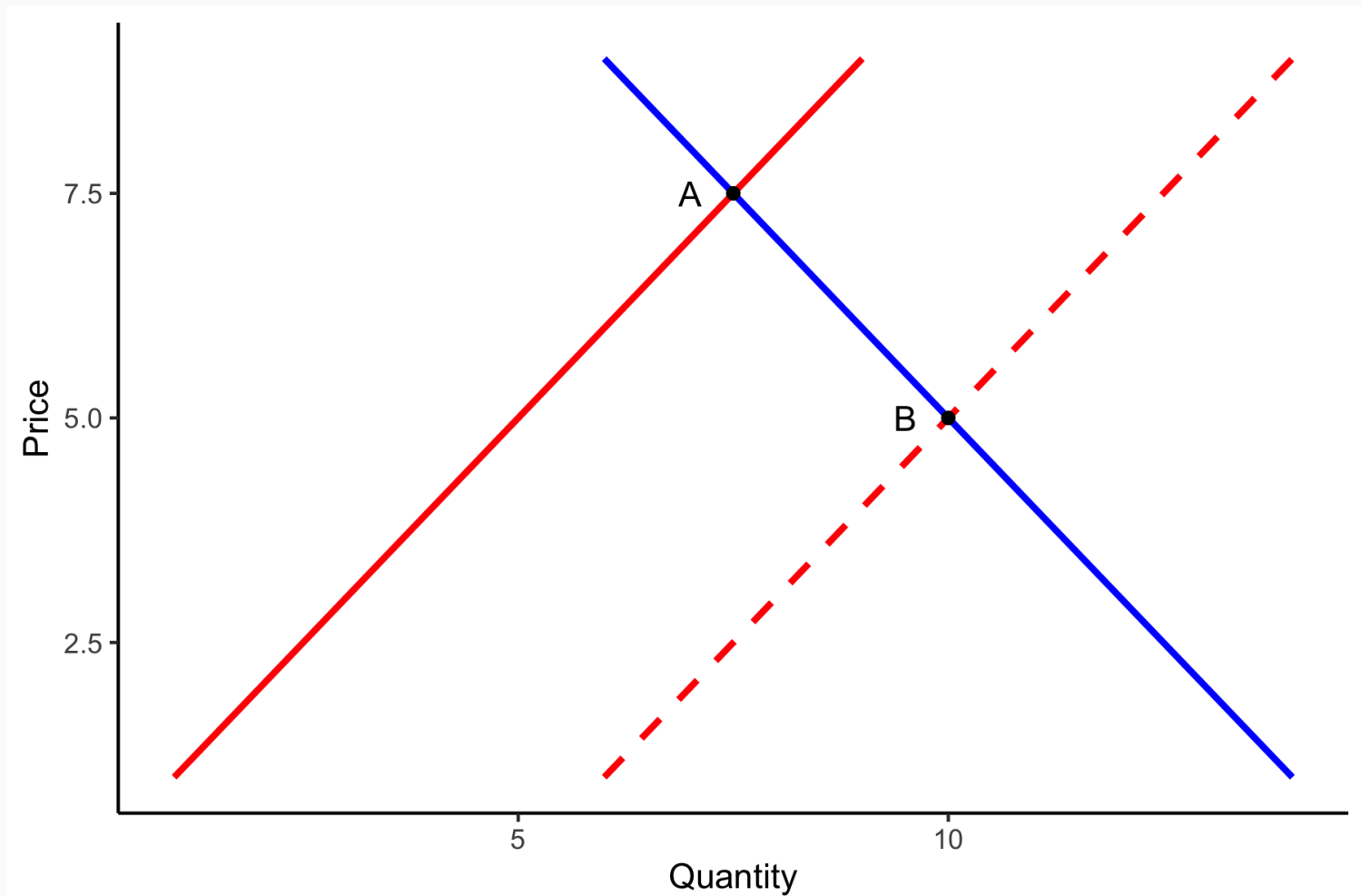
	No Change in Supply	An Increase in Supply	A Decrease in Supply
No Change in Demand	P same Q same	P down Q up	P up Q down
An Increase in Demand	P up Q up	P ambiguous Q up	P up Q ambiguous
A Decrease in Demand	P down Q down	P down Q ambiguous	P ambiguous Q down

Supply and Demand Shocks: Oil Markets



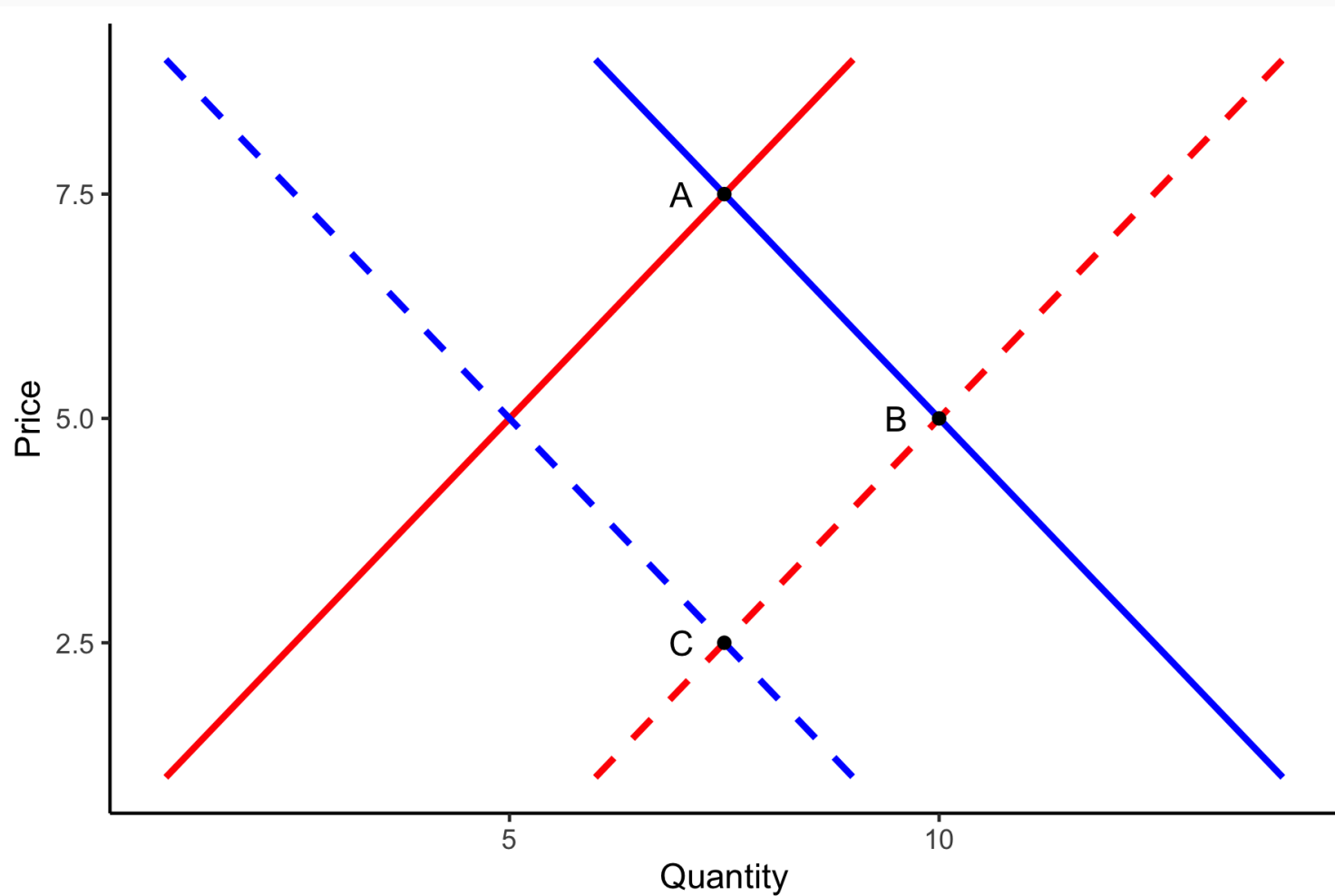
Supply and Demand Shocks: Example

- OPEC doesn't reach an agreement, supply increases



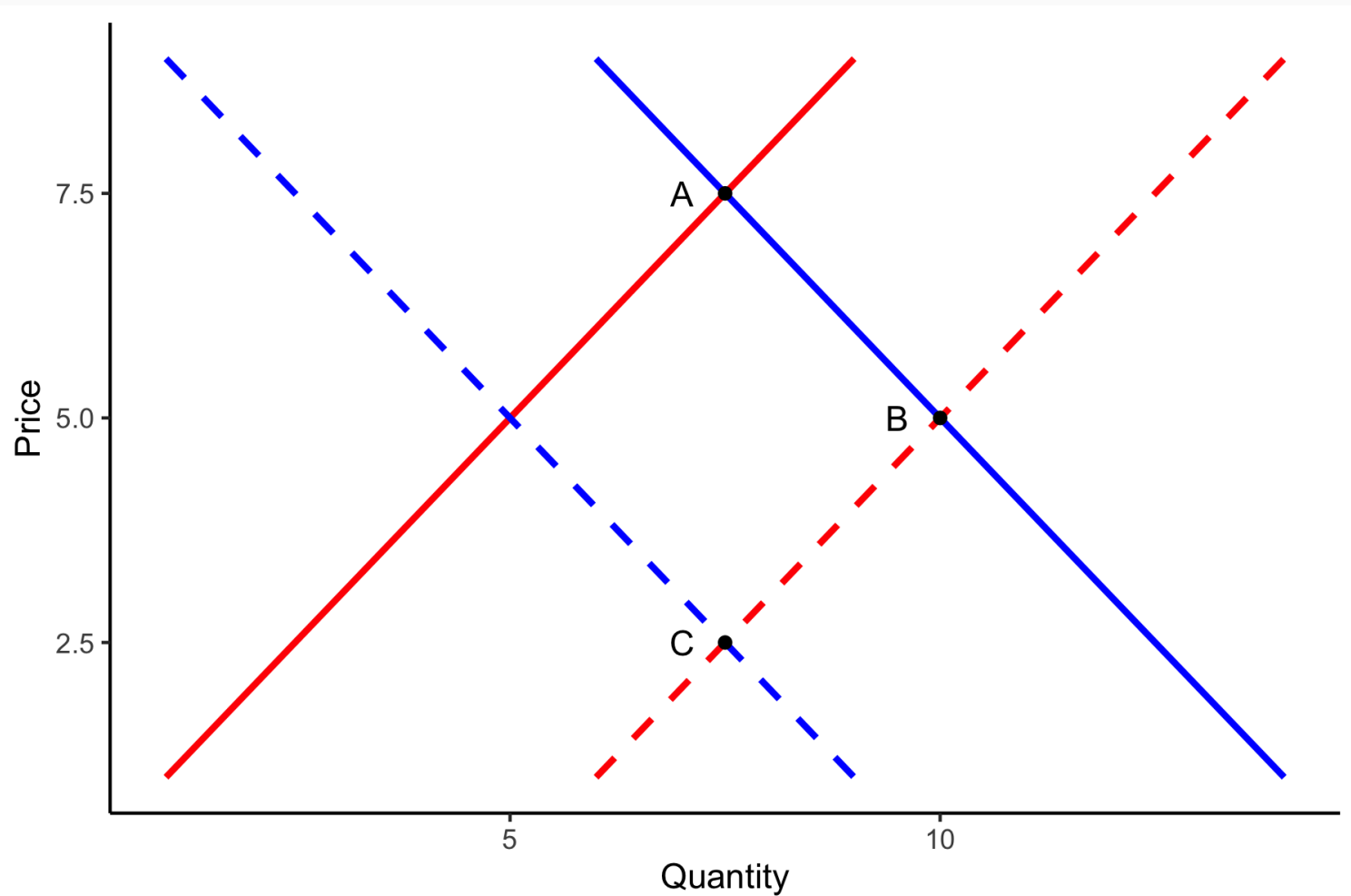
Supply and Demand Shocks: Example

- COVID hits and governments initiates lockdowns



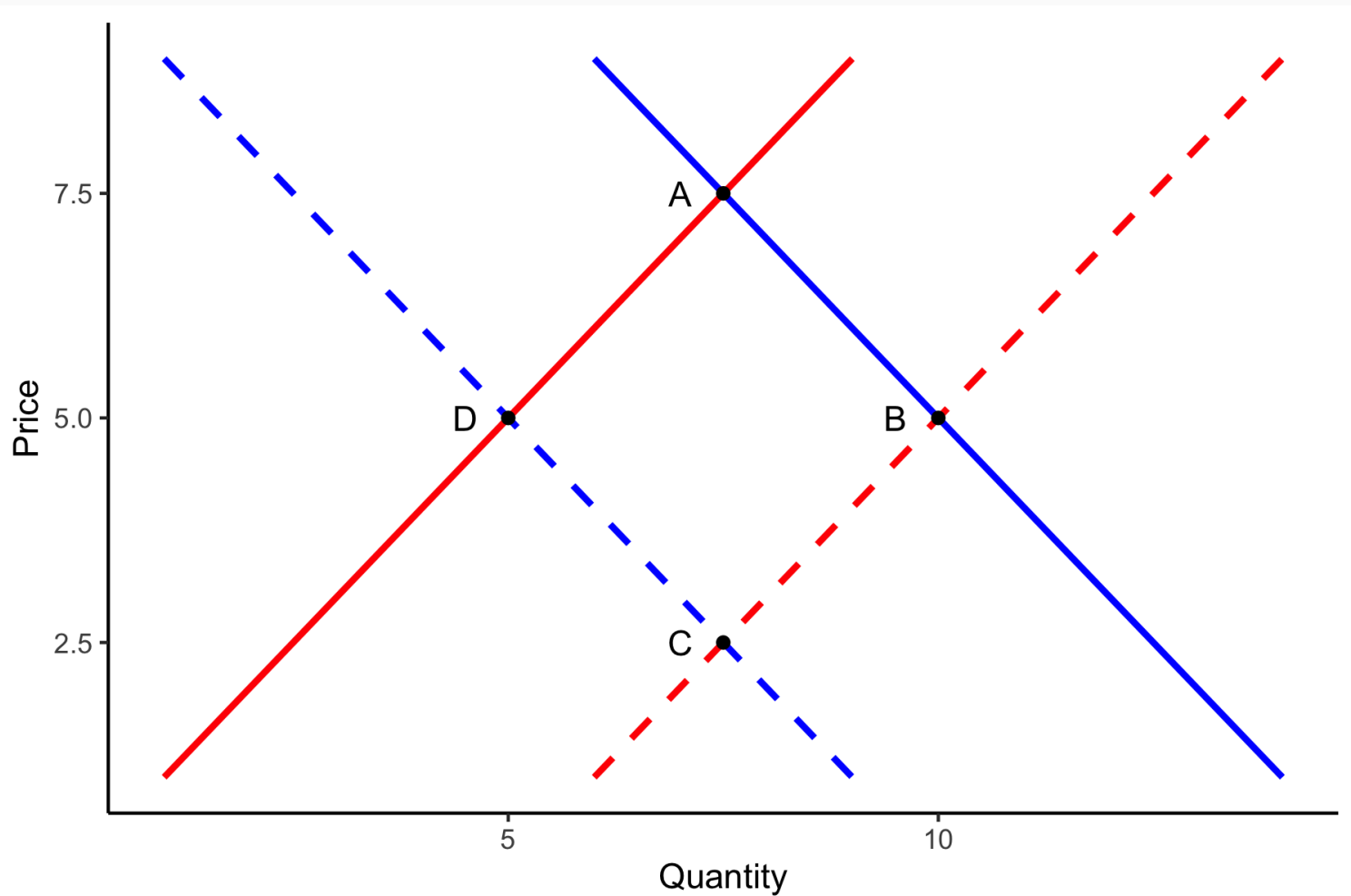
Supply and Demand Shocks: Example

- OPEC cuts supply, what happens now?



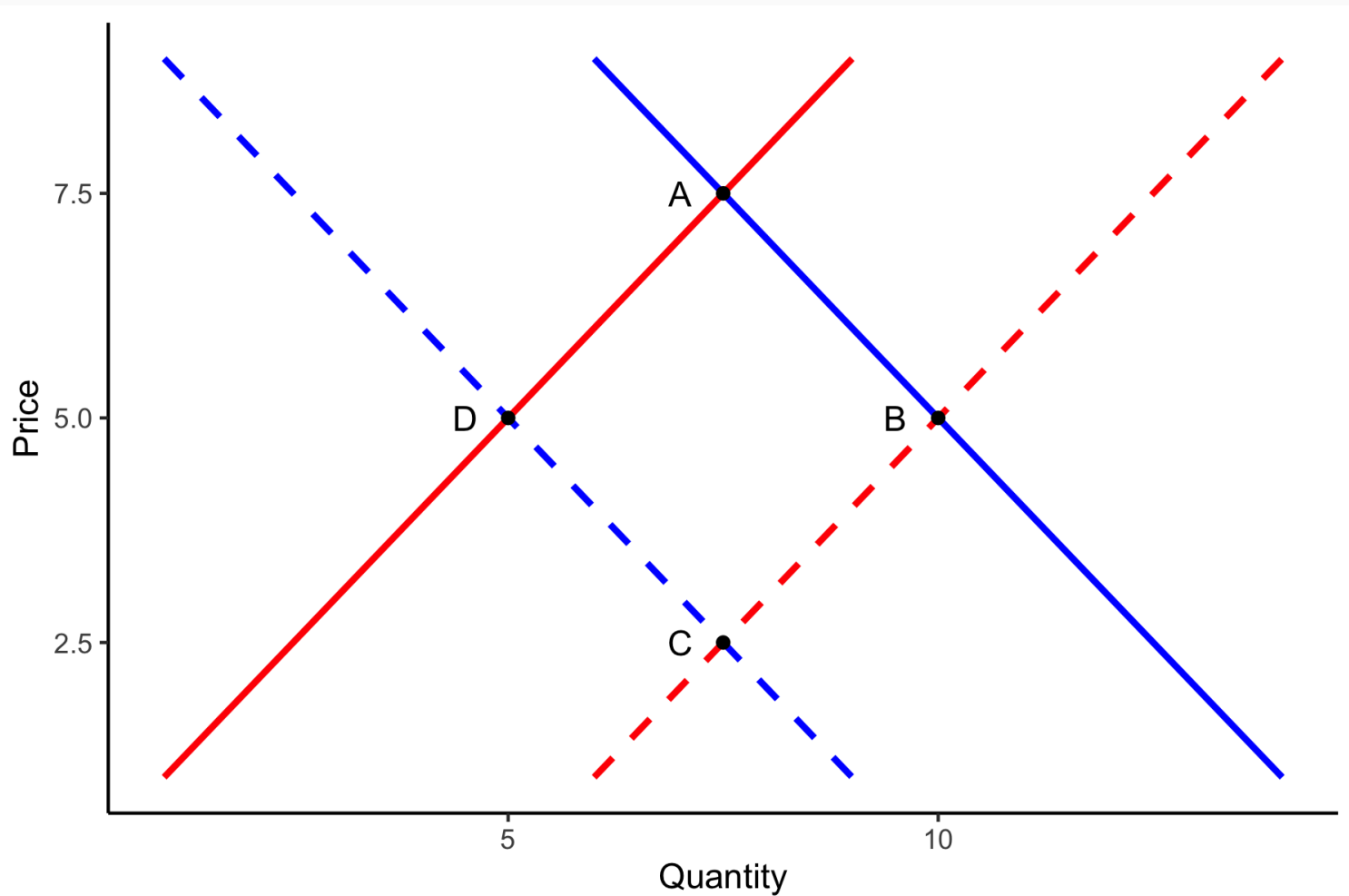
Supply and Demand Shocks: Example

- OPEC cuts supply, what happens now?



Supply and Demand Shocks: Example

- Lock downs are eased down, what happens now?



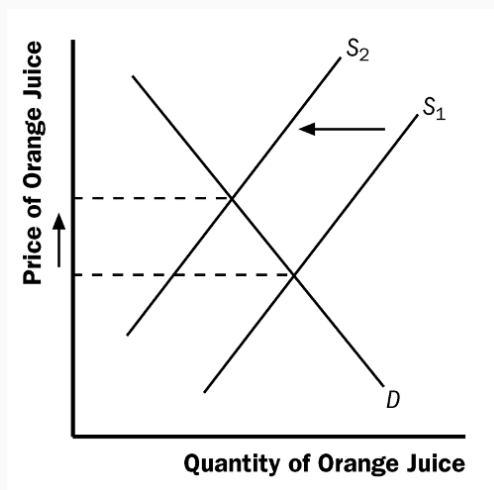
Problems and Applications

Question 1

Explain each of the following statements using a supply-and-demand diagram

a. “When a cold snap hits Florida, the price of orange juice rises in supermarkets throughout the country.”

Cold weather damages the orange crop, reducing the supply of oranges and raising the price of oranges. This leads to a decline in the supply of orange juice because oranges are an important input in the production of orange juice. This can be seen in Figure 6 as a shift to the left in the supply curve for orange juice. The new equilibrium price is higher than the old equilibrium price.

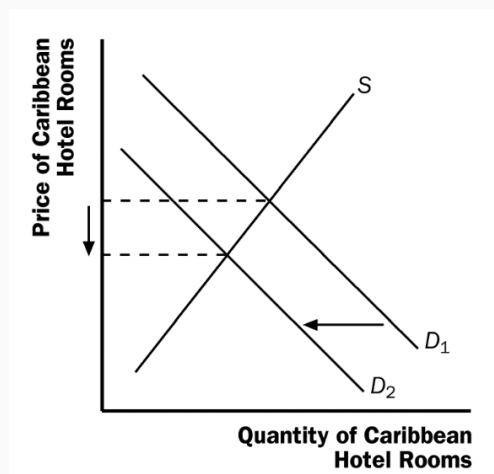


Question 1 (cont.)

Explain each of the following statements using a supply-and-demand diagram

b. “When the weather turns warm in New England every summer, the price of hotel rooms in Caribbean resorts plummets.”

People often travel to the Caribbean from New England to escape cold weather, so the demand for Caribbean hotel rooms is high in the winter. In the summer, fewer people travel to the Caribbean, because northern climates are more pleasant. The result, as shown in Figure 7, is a shift to the left in the demand curve. The equilibrium price of Caribbean hotel rooms is thus lower in the summer than in the winter, as the figure shows.



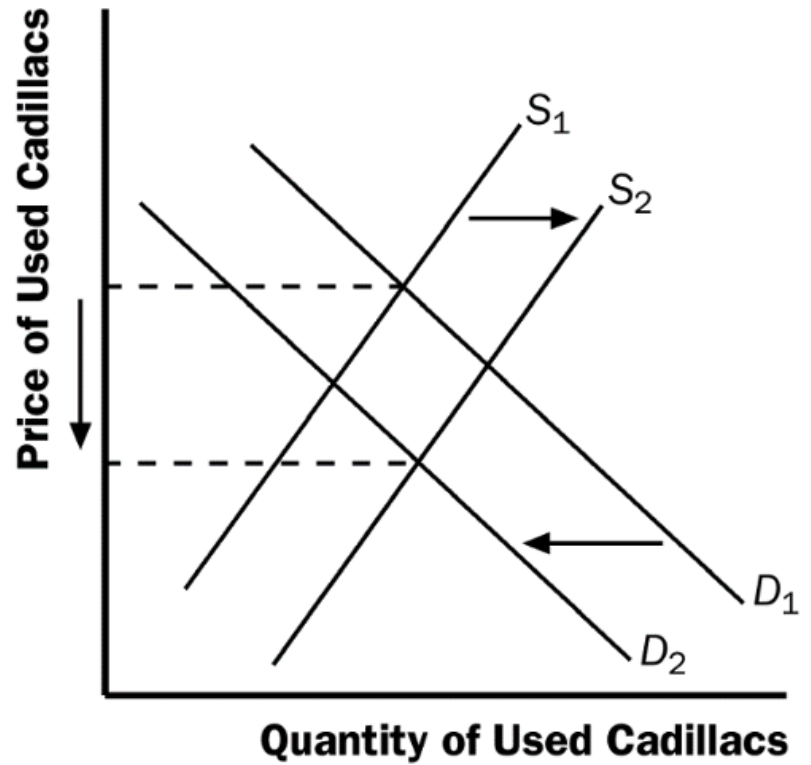
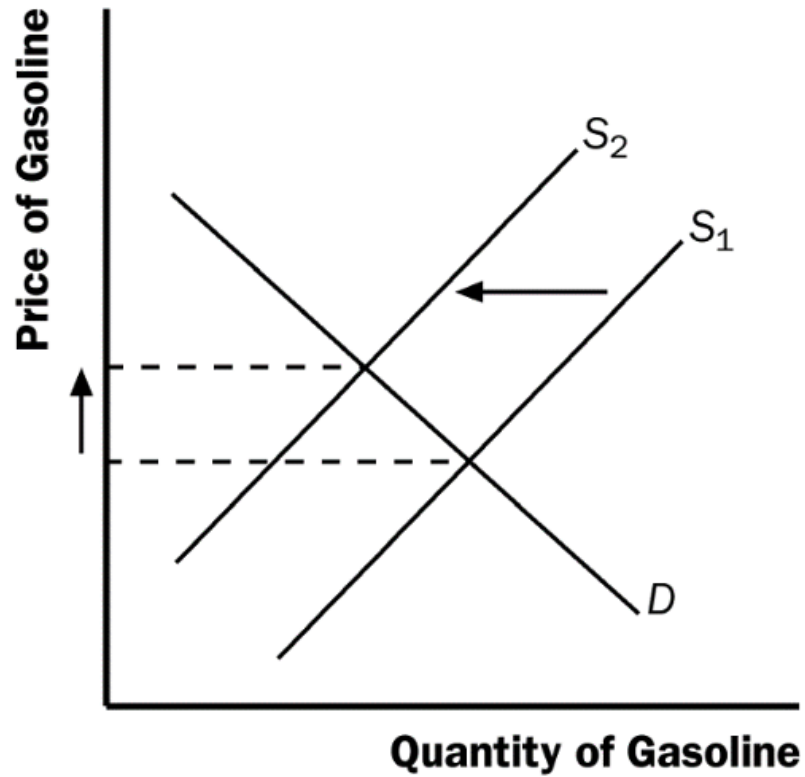
Question 1 (cont.)

Explain each of the following statements using a supply-and-demand diagram

c. “When a war breaks out in the Middle East, the price of gasoline rises and the price of a used Cadillac falls.”

When a war breaks out in the Middle East, many markets are affected. Because a large proportion of oil production takes place there, the war disrupts oil supplies, shifting the supply curve for gasoline to the left, as shown in Figure 8. The result is a rise in the equilibrium price of gasoline. With a higher price for gasoline, the cost of operating a gas-guzzling automobile like a Cadillac will increase. As a result, the demand for used Cadillacs will decline, as people in the market for cars will not find Cadillacs as attractive. In addition, some people who already own Cadillacs will try to sell them. The result is that the demand curve for used Cadillacs shifts to the left, while the supply curve shifts to the right, as shown in Figure 9. The result is a decline in the equilibrium price of used Cadillacs.

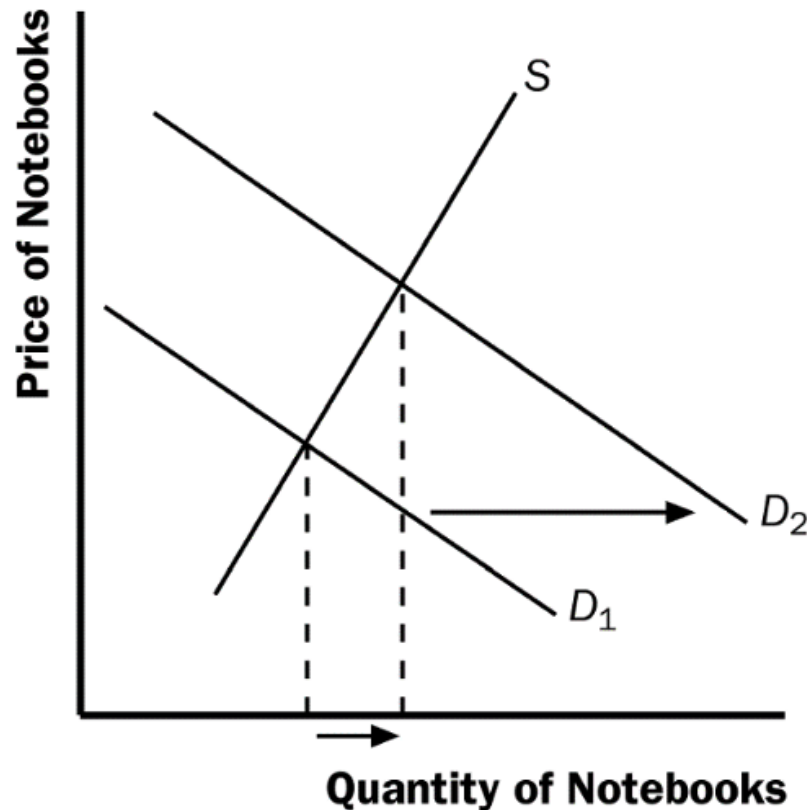
Question 1 (cont.)



Question 2

“An increase in the demand for notebooks raises the quantity of notebooks demanded but not the quantity supplied.” Is this statement true or false? Explain.

The statement is false. As the figure shows, in equilibrium, the increase in demand for notebooks results in an increased quantity demanded and the quantity supplied.

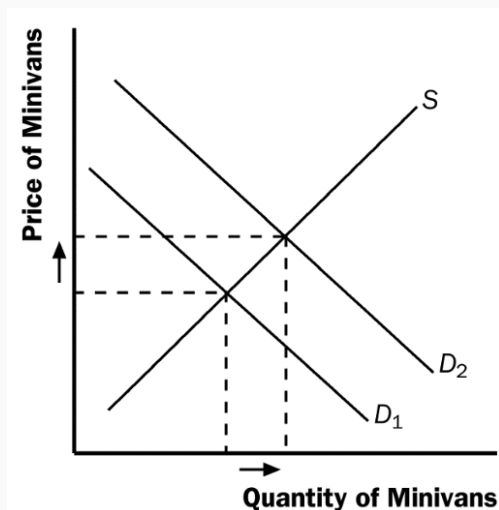


Question 3

Consider the market for minivans. For each of the events listed here, identify which of the determinants of demand or supply are affected. Also indicate whether demand or supply increases or decreases. Then draw a diagram to show the effect on the price and quantity of minivans.

a. People decide to have more children.

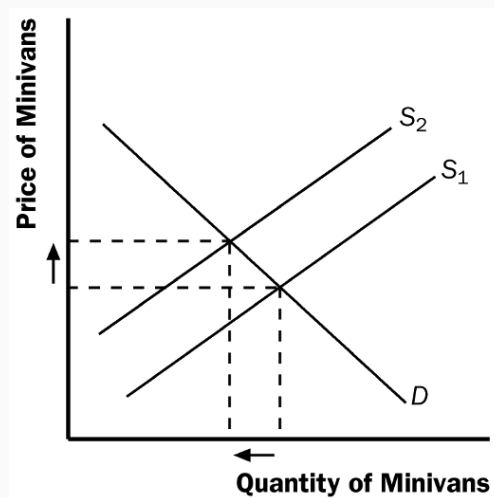
If people decide to have more children, they will want larger vehicles for hauling their kids around, so the demand for minivans will increase. Supply will not be affected. The result is a rise in both the price and the quantity sold



Question 3 (cont.)

b. A strike by steelworkers raises steel prices.

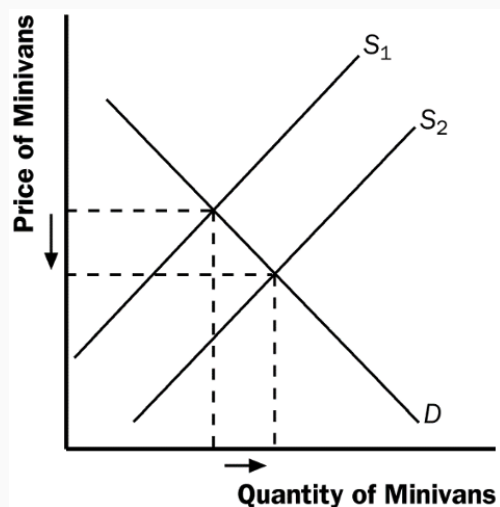
If a strike by steelworkers raises steel prices, the cost of producing a minivan rises, and the supply of minivans decreases. Demand will not be affected. The result is a rise in the price of minivans and a decline in the quantity sold



Question 3 (cont.)

c. Engineers develop new automated machinery for the production of minivans.

The development of new automated machinery for the production of minivans is an improvement in technology. This reduction in firms' costs will result in an increase in supply. Demand is not affected. The result is a decline in the price of minivans and an increase in the quantity sold

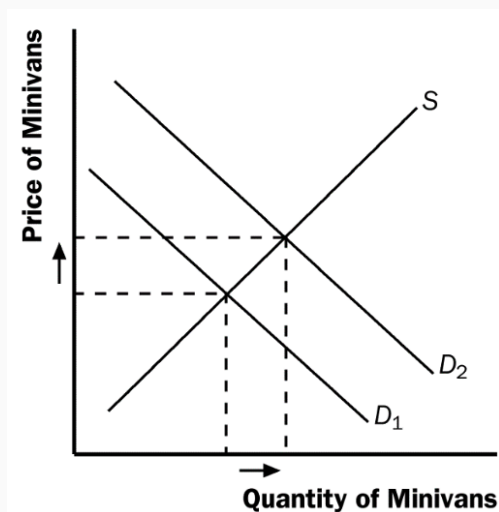


Question 3 (cont.)

d. The price of sports utility vehicles rises.

The rise in the price of sport utility vehicles affects minivan demand because sport utility vehicles are substitutes for minivans. The result is an increase in demand for minivans.

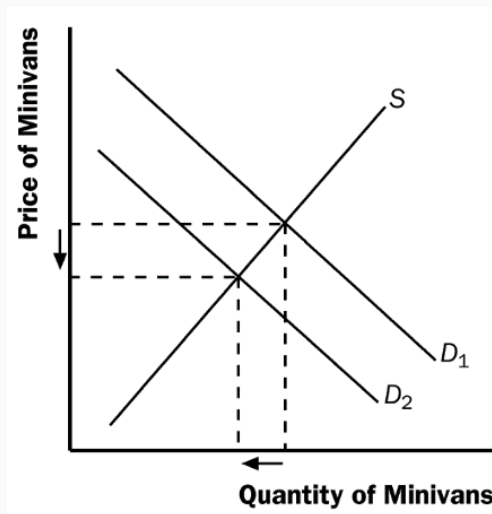
Supply is not affected. The equilibrium price and quantity of minivans both rise



Question 3 (cont.)

e. A stock market crash lowers people's wealth.

The reduction in peoples' wealth caused by a stock-market crash reduces their income, leading to a reduction in the demand for minivans because minivans are likely a normal good. Supply is not affected. As a result, both the equilibrium price and the equilibrium quantity decline



Question 4

Consider the markets for film streaming services, TV screens, and tickets at movie theaters.

a. For each pair, identify whether they are complements or substitutes:

- Film streaming and TV screens
- Film streaming and movie tickets
- TV screens and movie tickets

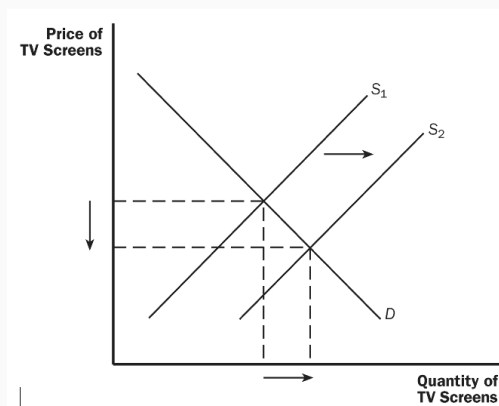
Film streaming services and TV screens are likely to be complements because you cannot watch a film without a television. Film streaming services and movie tickets are likely to be substitutes because a movie can be watched at a theater or at home. TV screens and movie tickets are likely to be substitutes for the same reason.

Question 4 (cont.)

Consider the markets for film streaming services, TV screens, and tickets at movie theaters.

b. Suppose a technological advance reduces the cost of manufacturing TV screens. Draw a diagram to show what happens in the market for TV screens.

The technological improvement would reduce the cost of producing a TV screen, shifting the supply curve to the right. The demand curve would not be affected. The result is that the equilibrium price will fall, while the equilibrium quantity will rise

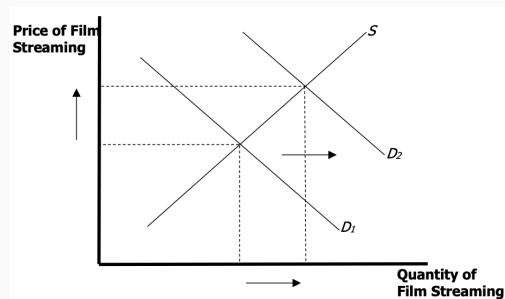


Question 4 (cont.)

Consider the markets for film streaming services, TV screens, and tickets at movie theaters.

c. Draw two more diagrams to show how the change in the market for TV screens affects the markets for film streaming and movie tickets.

The reduction in the price of TV screens would lead to an increase in the demand for film streaming services because TV screens and film streaming are complements. The effect of this increase in the demand for film streaming is an increase in both the equilibrium price and quantity

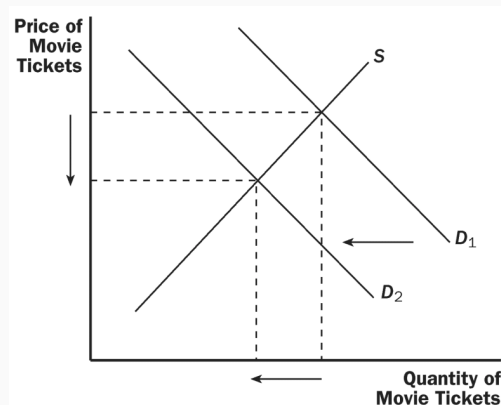


Question 4 (cont.)

Consider the markets for film streaming services, TV screens, and tickets at movie theaters.

c. Draw two more diagrams to show how the change in the market for TV screens affects the markets for film streaming and movie tickets.

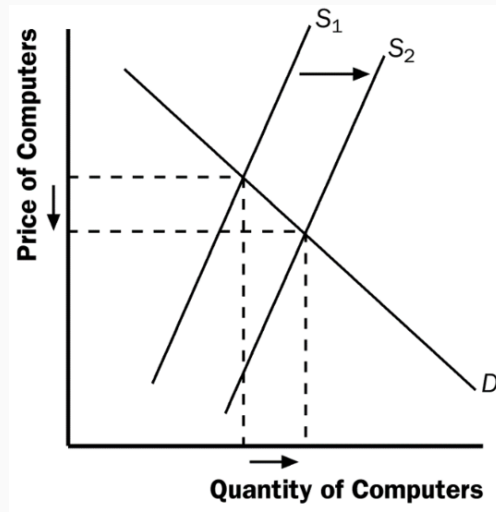
The reduction in the price of TV screens would cause a decline in the demand for movie tickets because TV screens and movie tickets are substitute goods. The decline in the demand for movie tickets would lead to a decline in the equilibrium price and quantity sold



Question 5

Over the past 40 years, technological advances have reduced the cost of computer chips. How do you think this has affected the market for computers? For computer software? For typewriters?

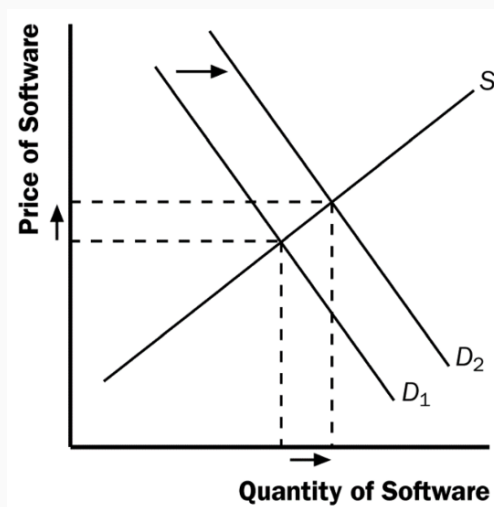
Technological advances that reduce the cost of producing computer chips represent a decline in the input price for producing a computer. The result is a shift to the right in the supply of computers. The equilibrium price falls and the equilibrium quantity rises, as the figure shows.



Question 5 (cont.)

Over the past 40 years, technological advances have reduced the cost of computer chips. How do you think this has affected the market for computers? For computer software? For typewriters?

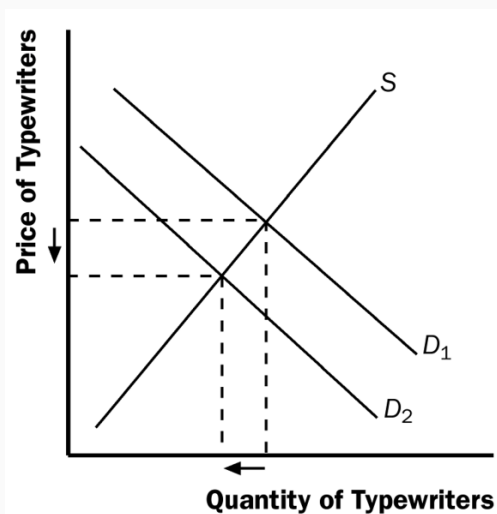
Because computer software is a complement to computers, the lower equilibrium price of computers increases the demand for software. The result is a rise in both the equilibrium price and quantity of software.



Question 5 (cont.)

Over the past 40 years, technological advances have reduced the cost of computer chips. How do you think this has affected the market for computers? For computer software? For typewriters?

Because typewriters are substitutes for computers, the lower equilibrium price of computers reduces the demand for typewriters. The result is a decline in both the equilibrium price and quantity of typewriters.

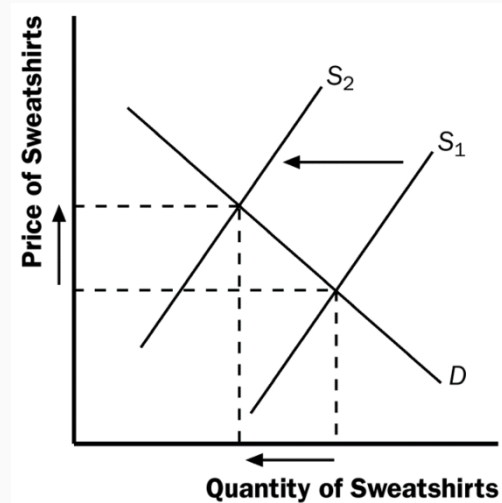


Question 6

Using supply-and-demand diagrams, show the effects of the following events on the market for sweatshirts.

a. A hurricane in South Carolina damages the cotton crop.

When a hurricane in South Carolina damages the cotton crop, it raises input prices for producing sweatshirts. As a result, the supply of sweatshirts shifts to the left. The new equilibrium price is higher and the new equilibrium quantity of sweatshirts is lower.

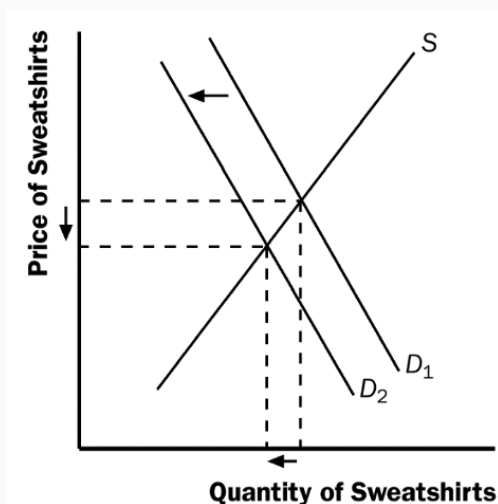


Question 6 (cont.)

Using supply-and-demand diagrams, show the effects of the following events on the market for sweatshirts.

b. The price of leather jackets falls.

A decline in the price of leather jackets leads more people to buy leather jackets, reducing the demand for sweatshirts. A decline in both the equilibrium price and quantity of sweatshirts.

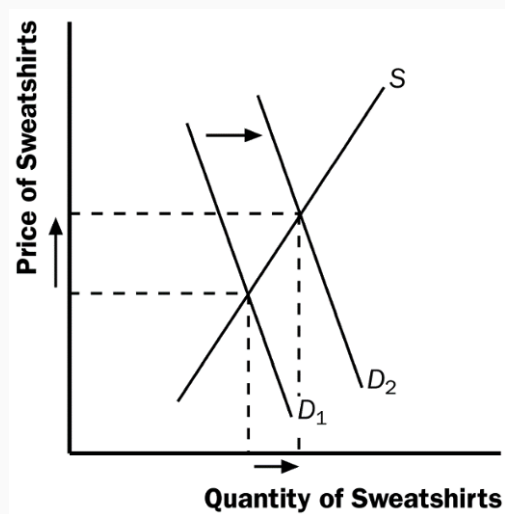


Question 6 (cont.)

Using supply-and-demand diagrams, show the effects of the following events on the market for sweatshirts.

c. All colleges require morning exercise in appropriate attire.

The effects of colleges requiring students to engage in a morning exercise in appropriate attire raise the demand for sweatshirts. The result is an increase in both the equilibrium price and quantity of sweatshirts.



Question 6 (cont.)

Using supply-and-demand diagrams, show the effects of the following events on the market for sweatshirts.

d. New knitting machines are invented.

The invention of new knitting machines increases the supply of sweatshirts. The result is a reduction in the equilibrium price and an increase in the equilibrium quantity of sweatshirts.

