Engineering Economics

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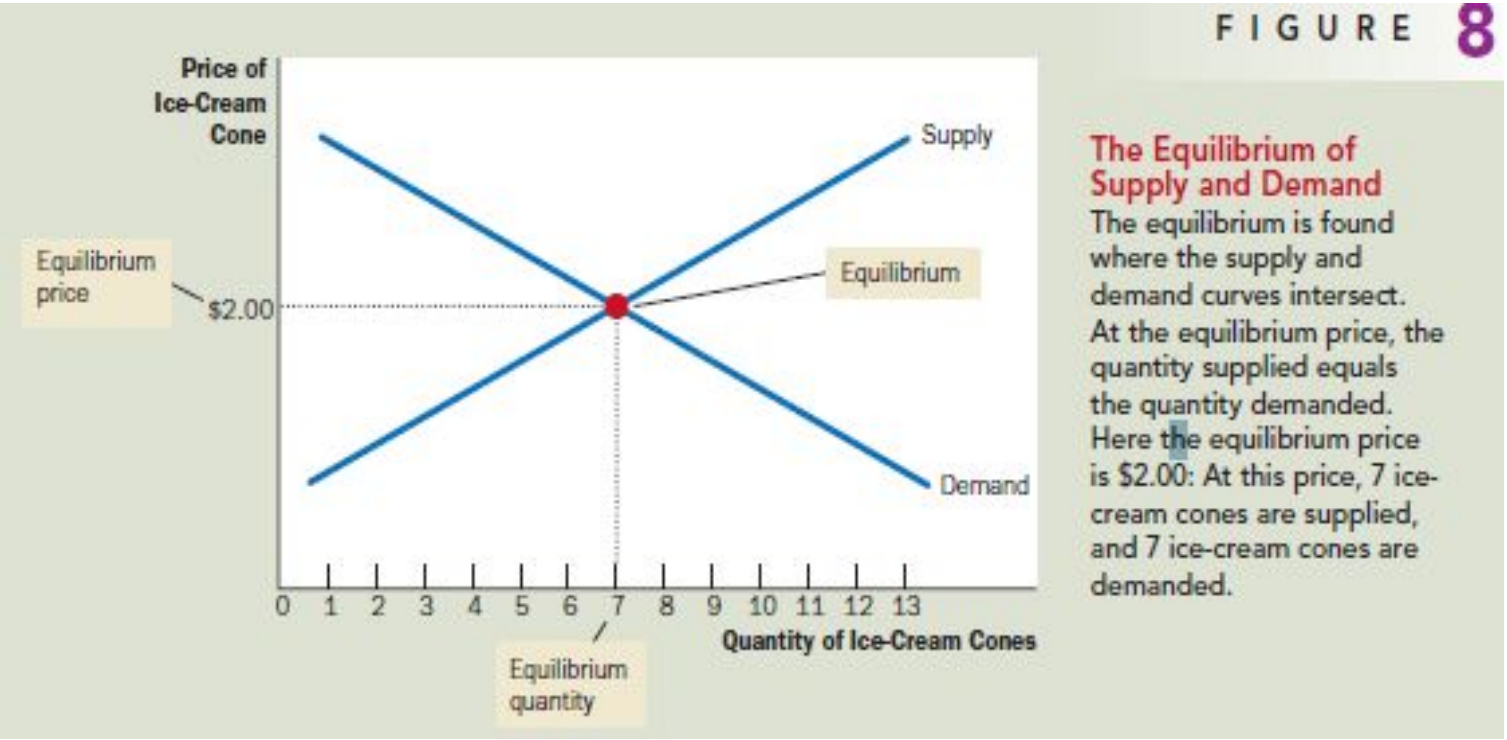
Lecture 4
Equilibrium

The Market Forces of Supply and Demand

- **Equilibrium**
- **Having analyzed supply and demand separately, we now combine them to see how they determine the price and quantity of a good sold in a market.**
- **Generally equilibrium is a situation in which various forces are in balance and there is no tendency to deviate.**
- **Market equilibrium is a situation in which the market price has reached the level at which quantity supplied equals quantity demanded.**

The Market Forces of Supply and Demand

- **Equilibrium**
- **Graphically, we find the equilibrium at the intersection of the supply and demand curves.**



The Market Forces of Supply and Demand

Equilibrium

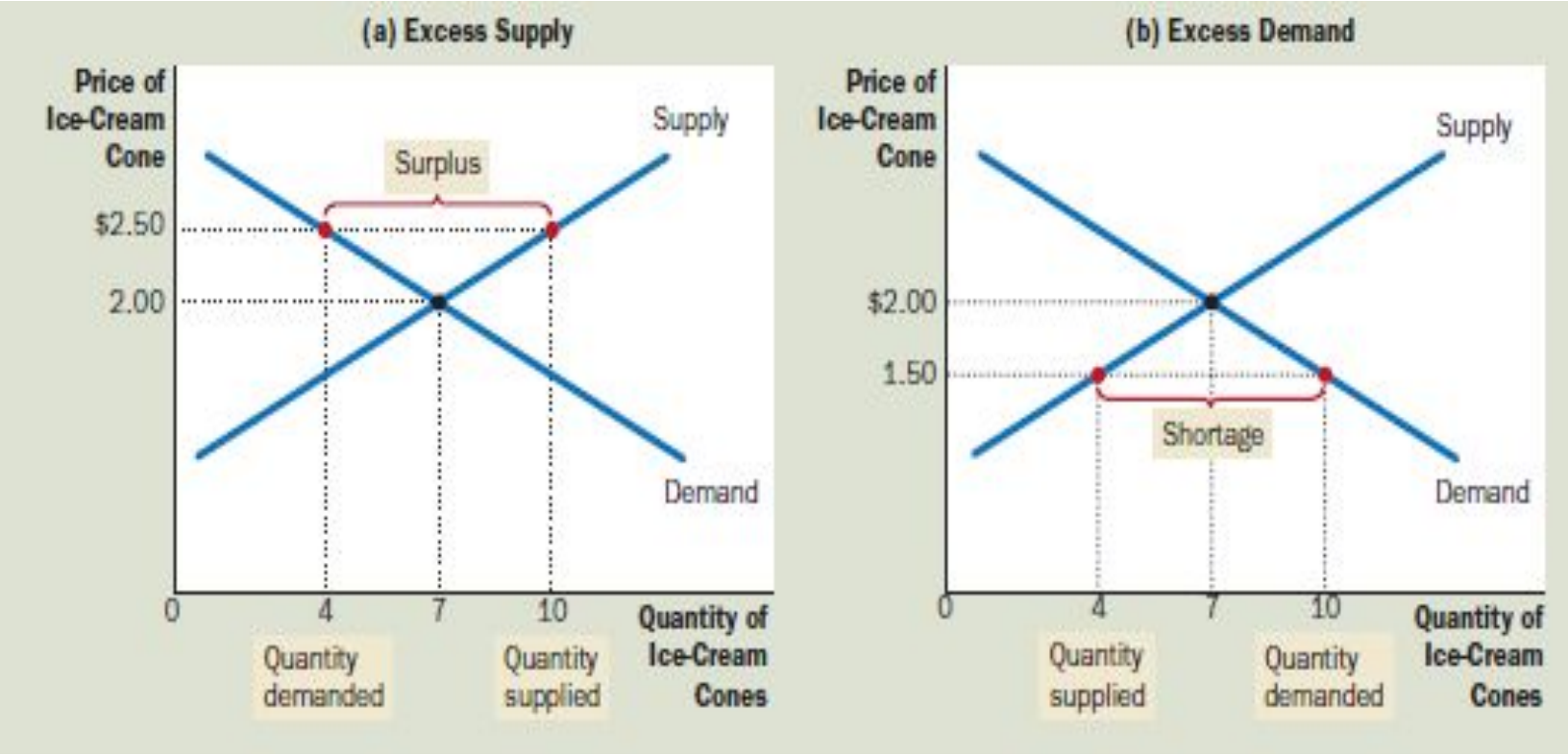
- **At the equilibrium price, the quantity of the good that buyers are willing and able to buy exactly balances the quantity that sellers are willing and able to sell.**

- **The equilibrium price is sometimes called the market-clearing price because, at this price, everyone in the market has been satisfied: Buyers have bought all they want to buy, and sellers have sold all they want to sell.**

- **The actions of buyers and sellers naturally move markets toward the equilibrium of supply and demand.**

The Market Forces of Supply and Demand

- **Equilibrium**
- **Consider what happens when the market price is not equal to the equilibrium price.**



The Market Forces of Supply and Demand

- **Equilibrium**
- **At price > equilibrium price: *excess supply or surplus* (a situation in which quantity supplied is greater than quantity demanded) arises and market forces to lower price.**
- **At prices < equilibrium price: *excess demand or shortage* (a situation in which quantity demanded is greater than quantity supplied) arises and market forces to raise price.**
- **Equilibrium price is market clearing price: no excess demand or excess supply exists at equilibrium price.**

The Market Forces of Supply and Demand

- **Equilibrium**
- **Thus, the activities of the many buyers and sellers automatically push the market price toward the equilibrium price.**
- **Once the market reaches its equilibrium, all buyers and sellers are satisfied, and there is no upward or downward pressure on the price.**
- **How quickly equilibrium is reached varies from market to market depending on how quickly prices adjust.**

The Market Forces of Supply and Demand

Equilibrium

- Given,

$$Q_d = 20 - 4P$$
$$Q_s = -2.5 + 5P$$

➢ Find the equilibrium price and quantity and show them into a diagram.

The Market Forces of Supply and Demand

Equilibrium

- We know that at equilibrium,

$$Q_d = Q_s$$
$$or, 20 - 4P = -2.5 + 5P$$
$$or, -4P - 5P = -2.5 - 20$$
$$or, -9P = -22.5$$
$$or, 9P = 22.5$$
$$or, P = 22.5/9$$
$$or, P = 2.5$$

So, equilibrium price is, $\bar{P} = 2.5$.

The Market Forces of Supply and Demand

Equilibrium

- We know that at equilibrium,

$$Q_d = 20 - 4P$$
$$or, Q_d = 20 - 4(2.5)$$
$$or, Q_d = 20 - 10$$
$$or, Q_d = 10$$

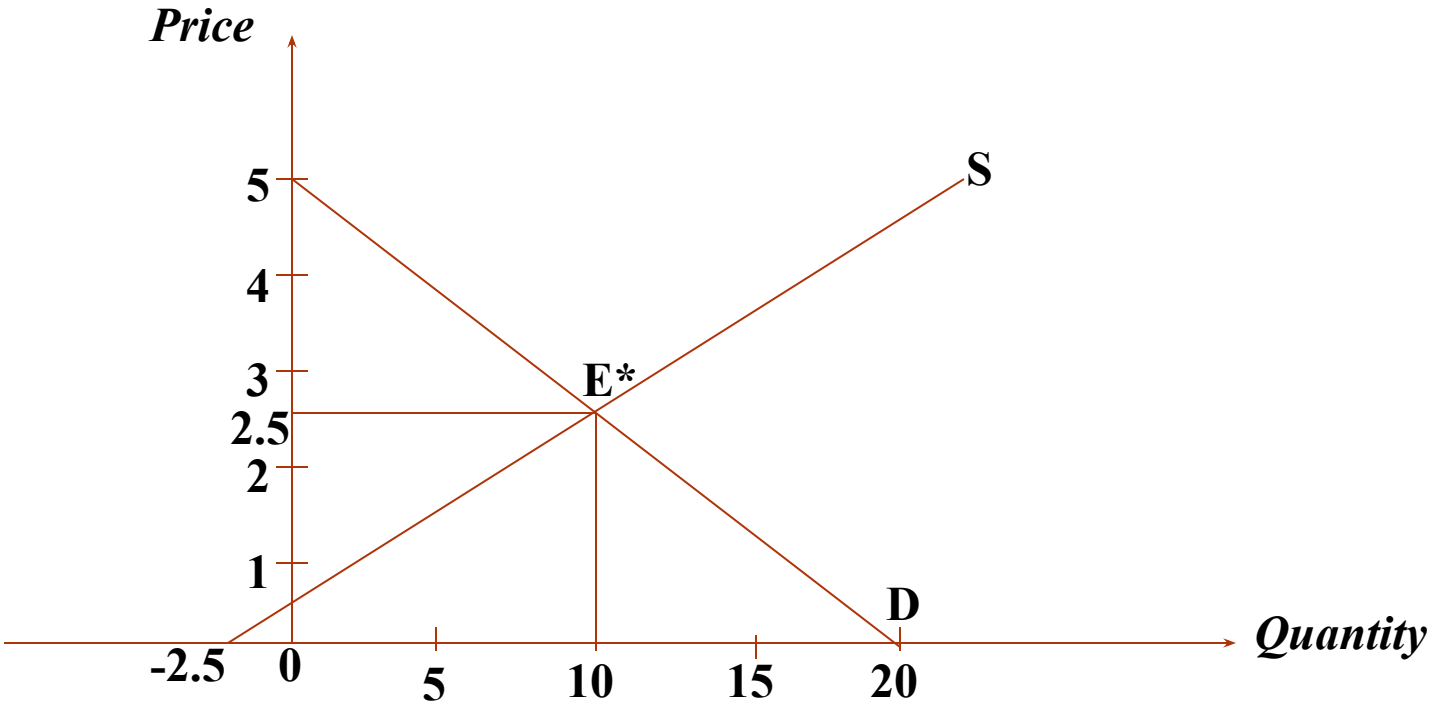
Or,

$$Q_s = -2.5 + 5P$$
$$or, Q_s = -2.5 + 5(2.5)$$
$$or, Q_s = -2.5 + 12.5$$
$$or, Q_s = 10$$

So, equilibrium quantity is, $\bar{Q}$ =10.

The Market Forces of Supply and Demand

- **Equilibrium: Graphical Representation**



The Market Forces of Supply and Demand

Three Steps to Analyzing Changes in Equilibrium

- So far, we have seen how supply and demand together determine a market's equilibrium, which in turn determines the price and quantity of the good that buyers purchase and sellers produce.

- The equilibrium price and quantity depend on the position of the supply and demand curves.

- When some event shifts one of these curves, the equilibrium in the market changes, resulting in a new price and a new quantity exchanged between buyers and sellers.

The Market Forces of Supply and Demand

Three Steps to Analyzing Changes in Equilibrium

- When analyzing how some event affects the equilibrium in a market, we proceed in three steps.

1. First, we decide whether the event shifts the supply curve, the demand curve, or, in some cases, both curves.
2. Second, we decide whether the curve shifts to the right or to the left.
3. Third, we use the supply-and-demand diagram to compare the initial and the new equilibrium, which shows how the shift affects the equilibrium price and quantity.

- To see how this recipe is used, let's consider various events that might affect the market for ice cream.

The Market Forces of Supply and Demand

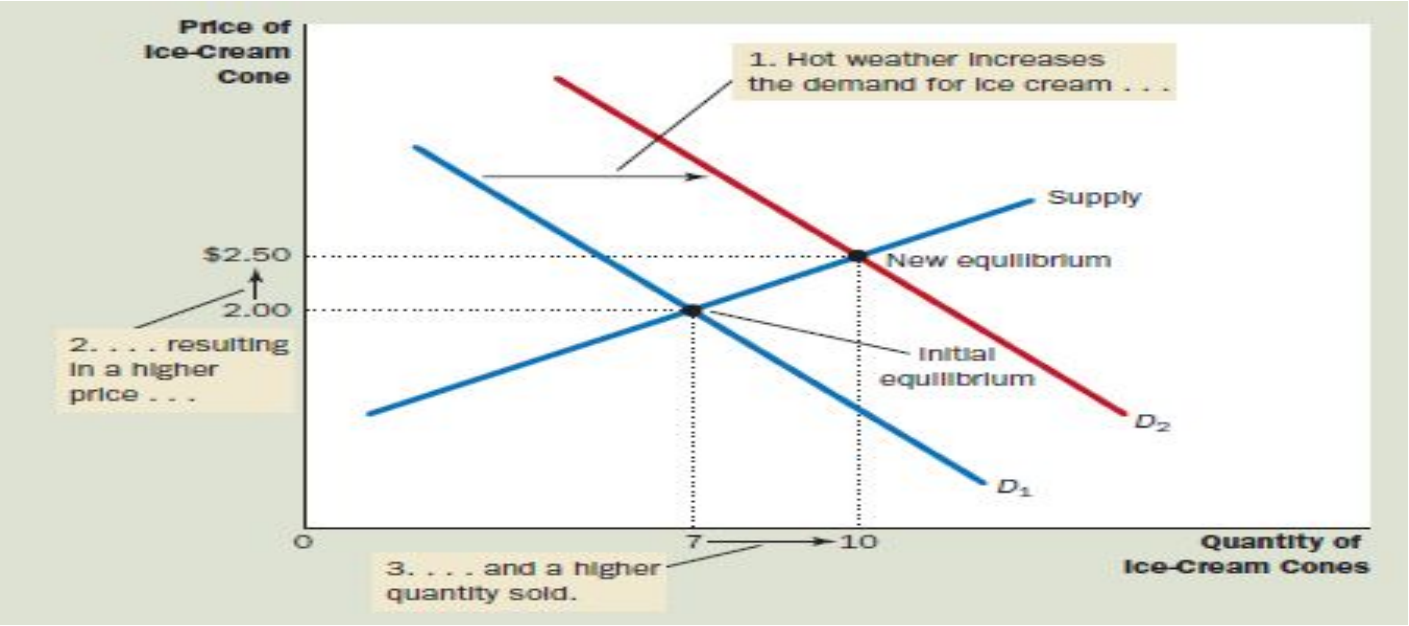
- ***Example: A Change in Market Equilibrium Due to a Shift in Demand.***

- **Suppose that one summer the weather is very hot. How does this event affect the market for ice cream? To answer this question, let's follow our three steps.**

1. **The hot weather changes the amount of ice cream that people want to buy at any given price. The supply curve is unchanged because the weather does not directly affect the firms that sell ice cream.**

The Market Forces of Supply and Demand

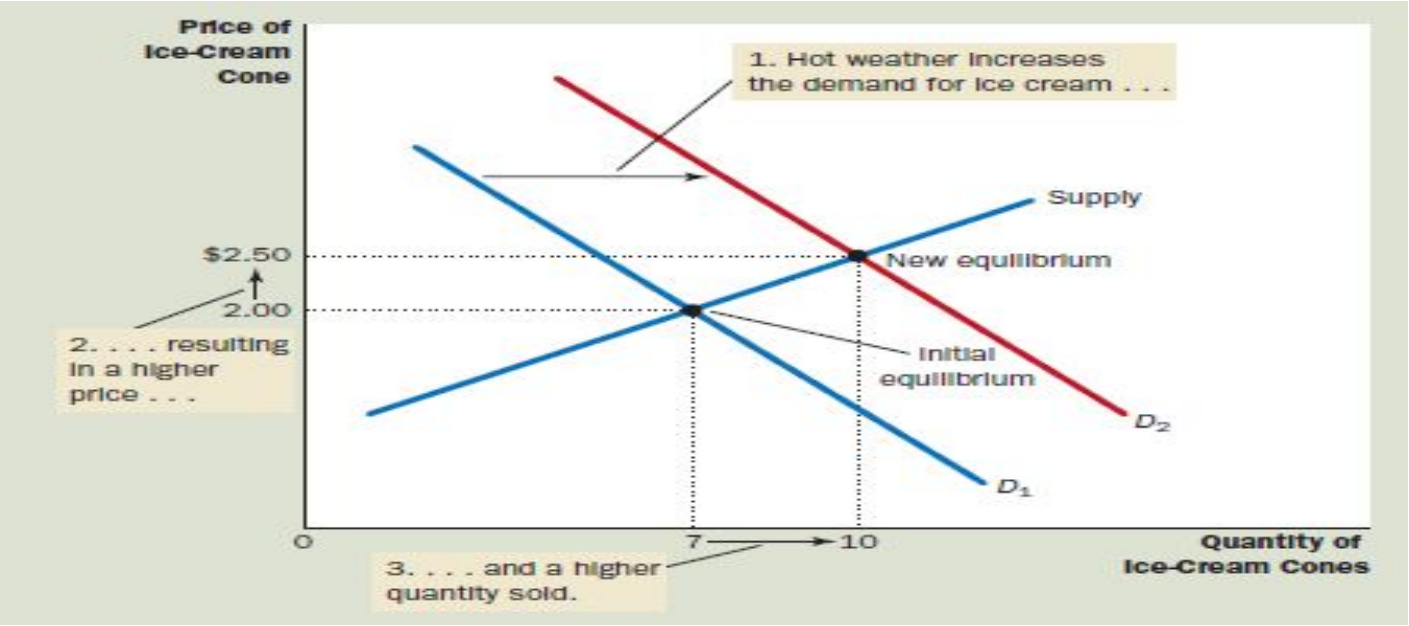
- ***Example: A Change in Market Equilibrium Due to a Shift in Demand.***



2. **Because hot weather makes people want to eat more ice cream, the demand curve shifts to the right from D_1 to D_2. This shift indicates that the quantity of ice cream demanded is higher at every price.**

The Market Forces of Supply and Demand

- ***Example: A Change in Market Equilibrium Due to a Shift in Demand.***



3. **The increase in demand raises the equilibrium price from $2.00 to $2.50 and the equilibrium quantity from 7 to 10 cones. In other words, the hot weather increases the price of ice cream and the quantity of ice cream sold.**

The Market Forces of Supply and Demand

- ***Example: A Change in Market Equilibrium Due to a Shift in Supply***

- **Suppose that during another summer, a hurricane destroys part of the sugarcane crop and drives up the price of sugar.**

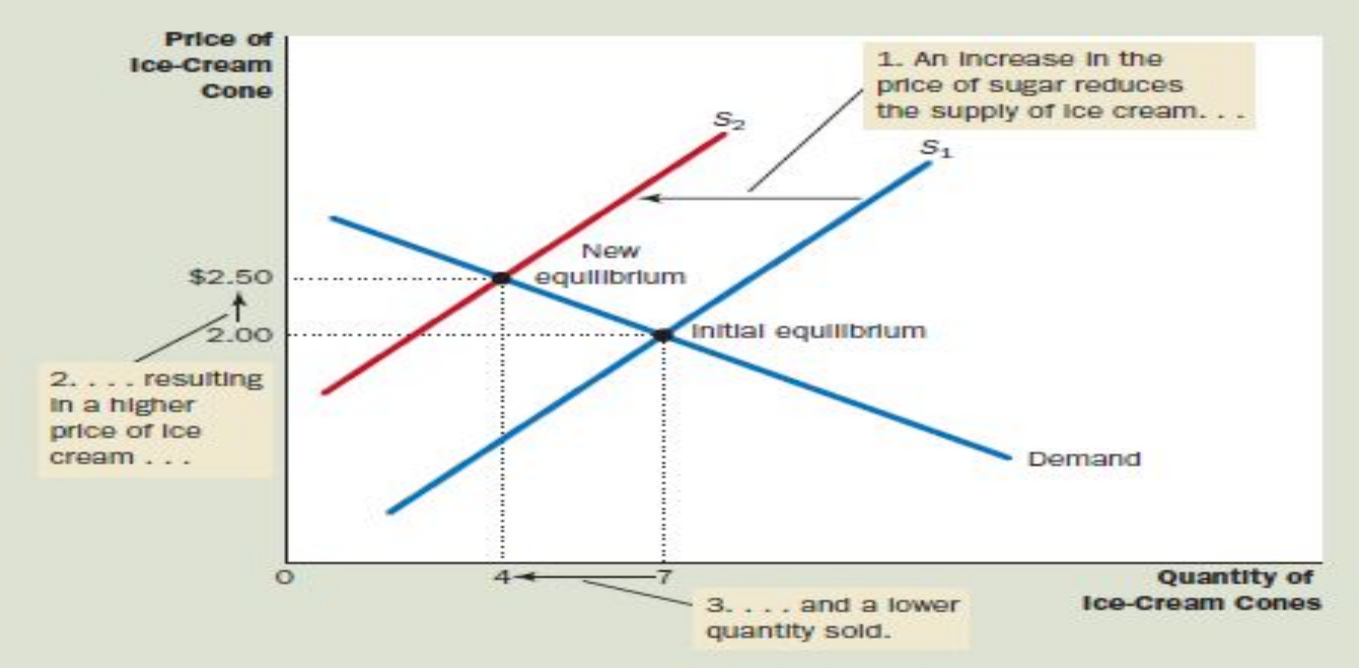
- ***How does this event affect the market for ice cream?*** **To answer this question, let's follow our three steps.**

1. **The change in the price of sugar, an input into making ice cream, affects the supply curve. By raising the costs of production, it reduces the amount of ice cream that firms produce and sell at any given price.**

   The demand curve does not change because the higher cost of inputs does not directly affect the amount of ice cream households wish to buy.

The Market Forces of Supply and Demand

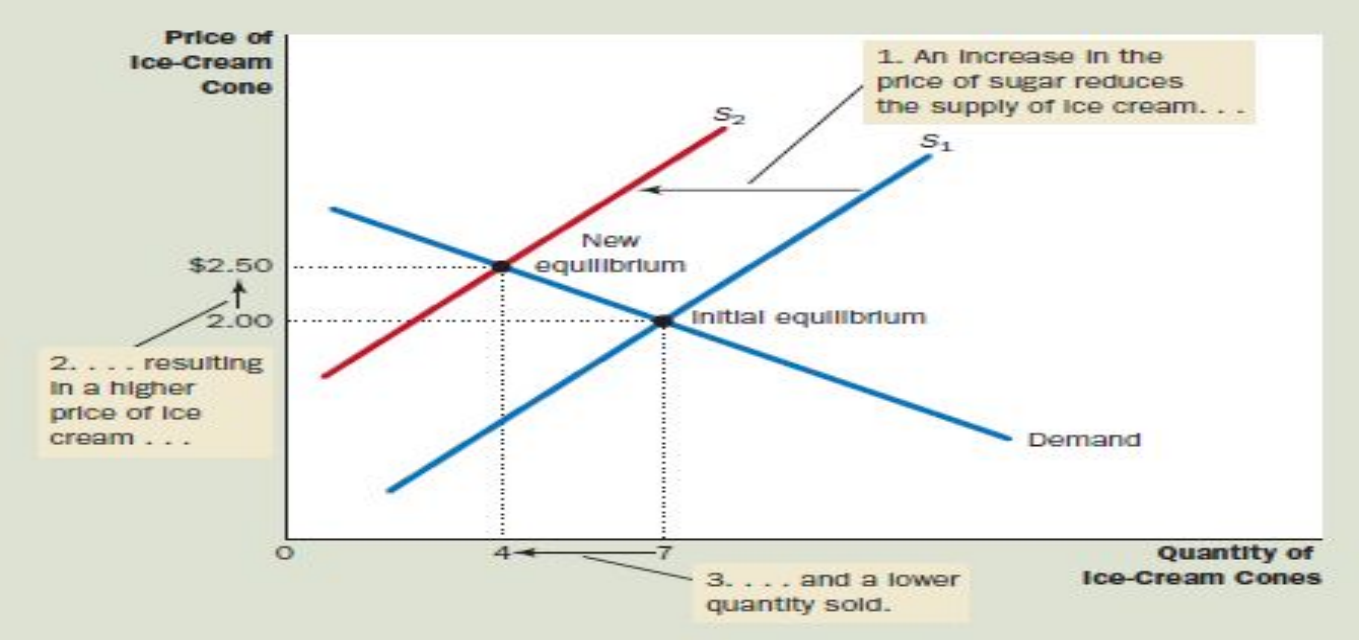
- ***Example: A Change in Market Equilibrium Due to a Shift in Supply***



2. **The supply curve shifts to the left from S_1 to S_2 because, at every price, the total amount that firms are willing and able to sell is reduced.**

The Market Forces of Supply and Demand

- ***Example: A Change in Market Equilibrium Due to a Shift in Supply***



4. **The shift in the supply curve raises the equilibrium price from $2.00 to $2.50 and lowers the equilibrium quantity from 7 to 4 cones**

The Market Forces of Supply and Demand

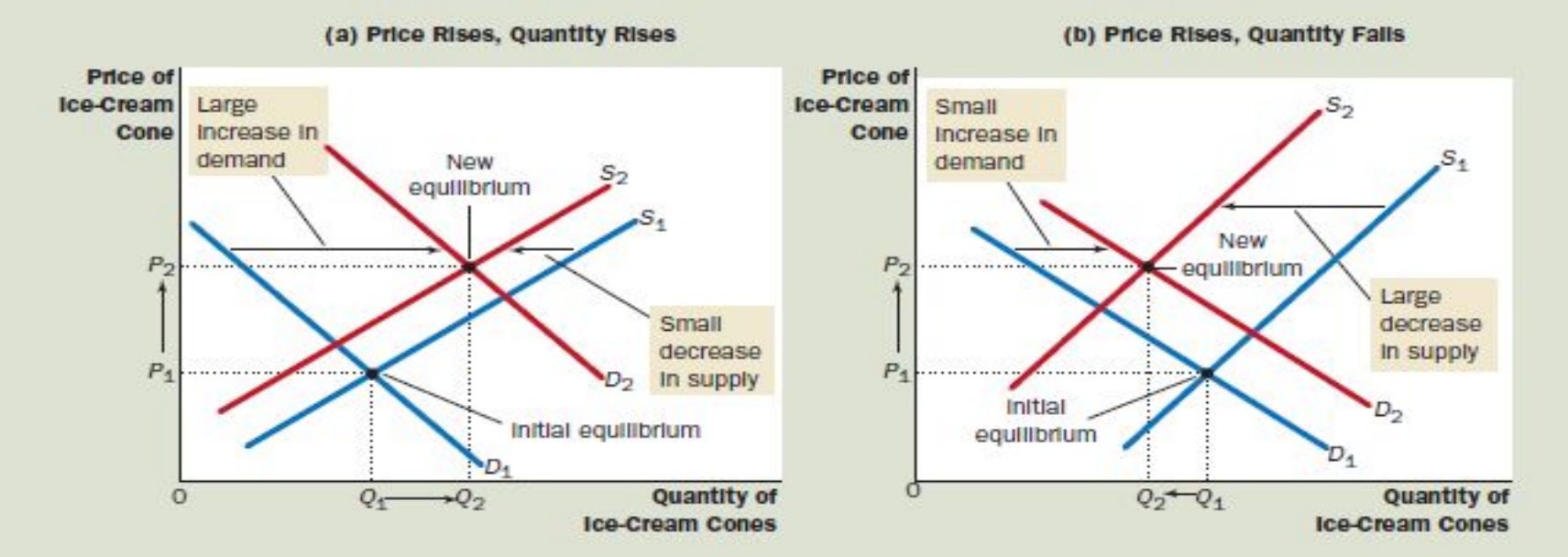
Example: Shifts in Both Supply and Demand

- **Now suppose that a heat wav and a hurricane occur during the same summer. To analyze this combination o events, we again follow our three steps.**

1. **The hot weather affects the demand curve because it alters the amount of ice cream that households want to buy at any given price. At the same time, when the hurricane drives up sugar prices, it alters the supply curve for ice cream because it changes the amount of ice cream that firms want to sell at any given price.**

The Market Forces of Supply and Demand

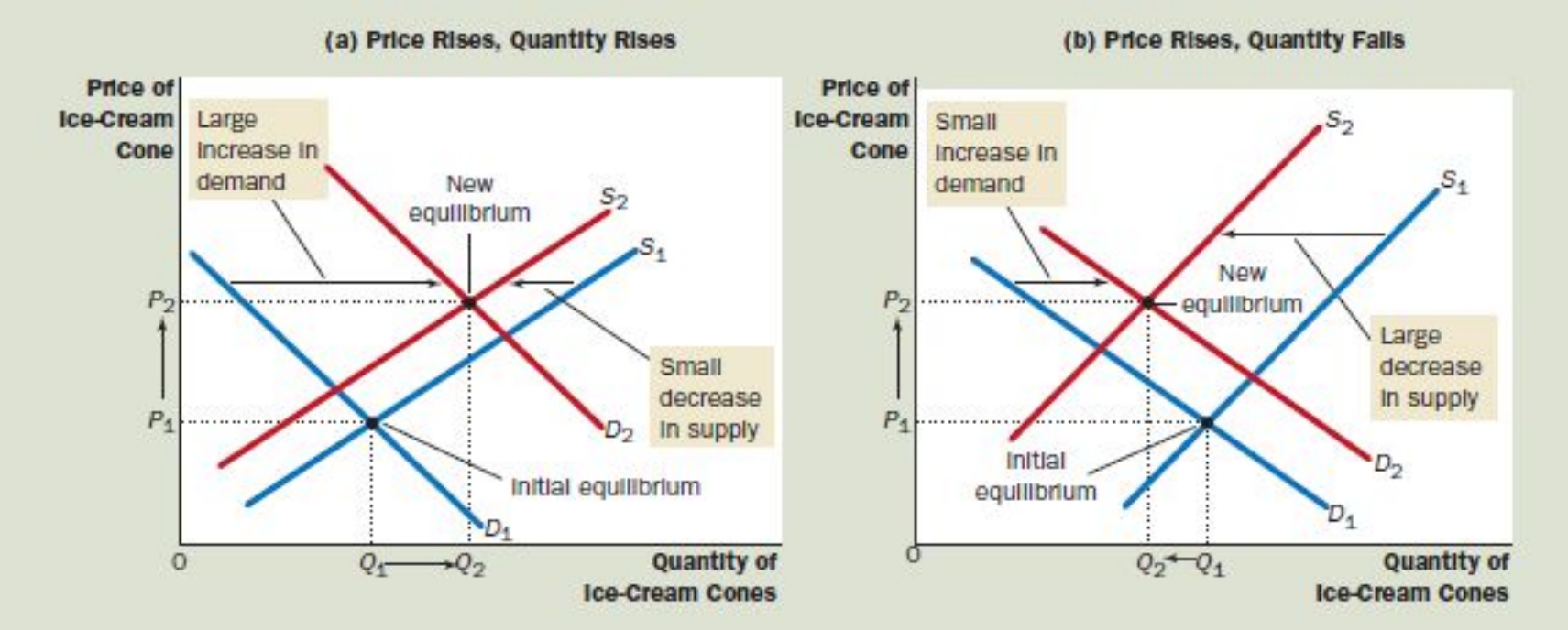
- ***Example: Shifts in Both Supply and Demand***



3. **The curves shift in the same directions as they did in our previous analysis: The demand curve shifts to the right, and the supply curve shifts to the left. Figure 12 illustrates these shifts.**

The Market Forces of Supply and Demand

- ***Example: Shifts in Both Supply and Demand***



4. **As Figure 12 shows, two possible outcomes might result depending on the relative size of the demand and supply shifts. In both cases, the equilibrium price rises.**

The Market Forces of Supply and Demand

- ***Example: Shifts in Both Supply and Demand***

- **In panel (a), where demand increases substantially while supply falls just a little, the equilibrium quantity also rises.**

- **By contrast, in panel (b), where supply falls substantially while demand rises just a little, the equilibrium quantity falls.**

- **Thus, these events certainly raise the price of ice cream, but their impact on the amount of ice cream sold is ambiguous (that is, it could go either way).**

The Market Forces of Supply and Demand

- **Three Steps to Analyzing Changes in Equilibrium**
  - **Table 4 shows the predicted outcome for any combination of shifts in the two curves.**

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

The Market Forces of Supply and Demand

Quick Test

- On the appropriate diagram, show what happens to the market for pizza if the price of chesses rises.
- On a separate diagram, show what happens to the market for pizza if the price of hamburgers falls.
- If both the price of chesses rises and the price of hamburgers falls show what happens to the market for pizza.

Readings

- N. G. Mankiw- Principles of Microeconomics, 5th Edition, Chapter – 4.

- Michael Parkin - Microeconomics, 10th Edition (Pearson Series in Economics) - Prentice Hall (2011), Chapter – 3.


ANY
QUESTIONS?

Thank You