

CHAPTER 3

Supply and Demand

Learning Objectives

- How the demand curve summarizes the behavior of buyers in the marketplace.
- How the supply curve summarizes the behavior of sellers in the marketplace.
- How the supply and demand curves interact to determine the equilibrium price and quantity.
- How shifts in supply and demand curves cause prices and quantities to change.
- The relationship between individual demand and supply curves with market demand and supply curves.

Food in Cairo

- Stock of foodstuffs in Cairo is sufficient to feed 8 million people for at most a week or so.
- Most of us take this fact (provision and distribution of food) for granted.
- The system that manages the distribution of food in Cairo must somehow ensure that not only enough food is delivered, but also the right kinds of food.

Housing in Cairo

- Cairo's rental housing market is strikingly different from its food market.
- Cairo needs about 260,000 new housing units each year to keep up with population growth.
- Actual rate of new construction far exceeds that, resulting in a protracted housing surplus.
 - Vacant housing units range between 200,000 to 523,000.
 - These units target mainly middle and upper-income families.
- Affordable housing units, on the other hand, are scarce.

Food vs. Housing in Cairo

- Free market, for the most part, determines the allocation of food. It is working well as far as we can tell and it is quite efficient.
- Administrative rent regulations, for the most part, determine the allocation of housing units. This market, however, seems not functioning well and there is a large mismatches between provided units and demanded units.

Markets and Competition

- A *market* is a group of sellers and buyers of a particular good or service.



- The terms supply and demand refer to the behavior of sellers and buyers as they interact with one another in markets.

Competitive Markets

- A **competitive market** is a market in which there are many buyers and sellers so that each has a negligible impact on the market price.
- It is the simplest form of market to analyze, because the market price is like a wall that separates the buyers and sellers in the competitive market.
- Thus, we can separately model the behavior of buyers and sellers in the market.

Competition: Perfect and Otherwise

- Perfect Competition
 - Products are the same
 - Numerous buyers and sellers so that each has no influence over price

Buyers and Sellers are price takers.

- Monopoly
 - One seller

**Monopolist (i.e. seller) controls price
(set the price and/or quantity)**

DEMAND

- *Quantity demanded* is the amount of a good that buyers are willing and able to purchase.
- Law of Demand
 - The *law of demand* states that, other things equal, the quantity demanded of a good falls when the price of the good rises.

Demand Slopes Downward

Basic explanations for the Law of Demand:

- **Substitution Effect**
 - As pizza becomes more expensive, a consumer may switch to other foods that substitute for pizza
- **Income Effect**
 - A higher price lowers the purchasing power of a consumer, resulting in reduced consumption (if it is a normal good!)
- **Demand reflects the entire market, not one consumer**
 - Lower prices bring more buyers into the market
 - Lower prices cause existing buyers to buy more

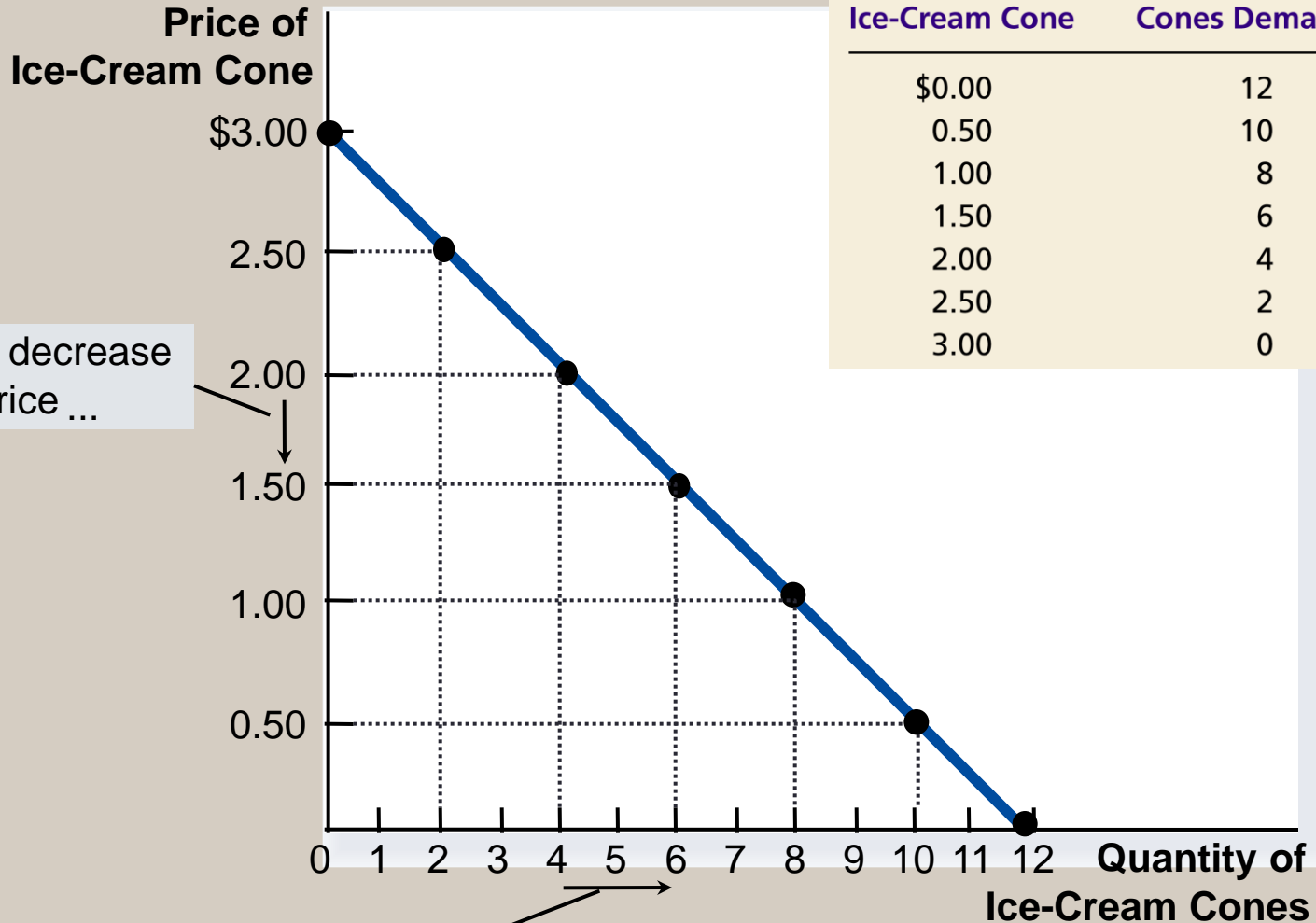
The Demand Curve: The Relationship between Price and Quantity Demanded

- Demand Schedule
 - The **demand schedule** is a table that shows the relationship between the price and the quantity demanded of a good.
- Demand Curve
 - The **demand curve** is a graph of the relationship between the price of a good and the quantity demanded.

Catherine's Demand Schedule

Price of Ice-Cream Cone	Quantity of Cones Demanded
\$0.00	12
0.50	10
1.00	8
1.50	6
2.00	4
2.50	2
3.00	0

Figure 1 Catherine's Demand Schedule and Demand Curve



1. A decrease in price ...

2. ... increases quantity of cones demanded.

Linear Demand Equation

- In this course, almost always we work with simplest form of the demand curve: **Linear Demand**.
- The equation for a linear demand, such as above example, can be determined by only two points on the demand line.
- For example, (\$2, 4) and (\$1.5, 6) are on the above demand line. Then, the demand line is:

$$\frac{Q - Q_1}{Q_2 - Q_1} = \frac{P - P_1}{P_2 - P_1} \Rightarrow$$

$$\frac{Q - 4}{6 - 4} = \frac{P - 2}{1.5 - 2} \Rightarrow$$

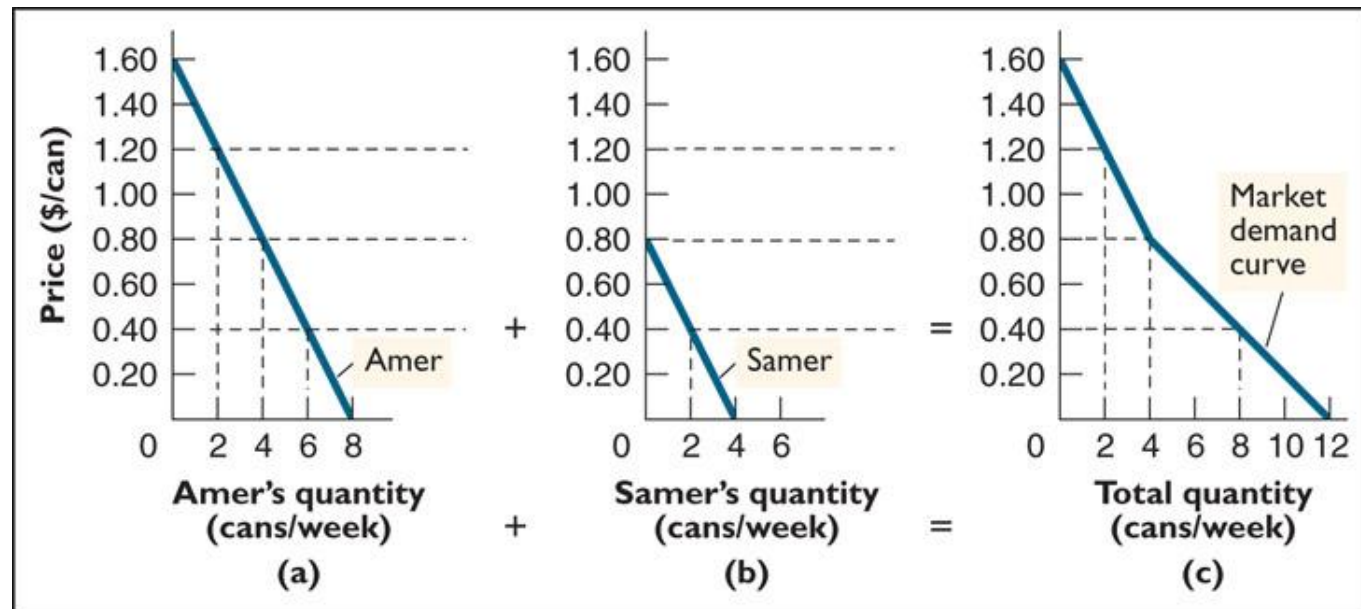
$$Q = 12 - 4P \quad \text{or} \quad P = 3 - \frac{1}{4}Q$$

Market Demand versus Individual Demand

- Market demand refers to the sum of all individual demands for a particular good or service.
- Graphically, individual demand curves are summed horizontally to obtain the market demand curve.

Demand: Individual v. Market

- Horizontal summation = adding quantities at fixed prices

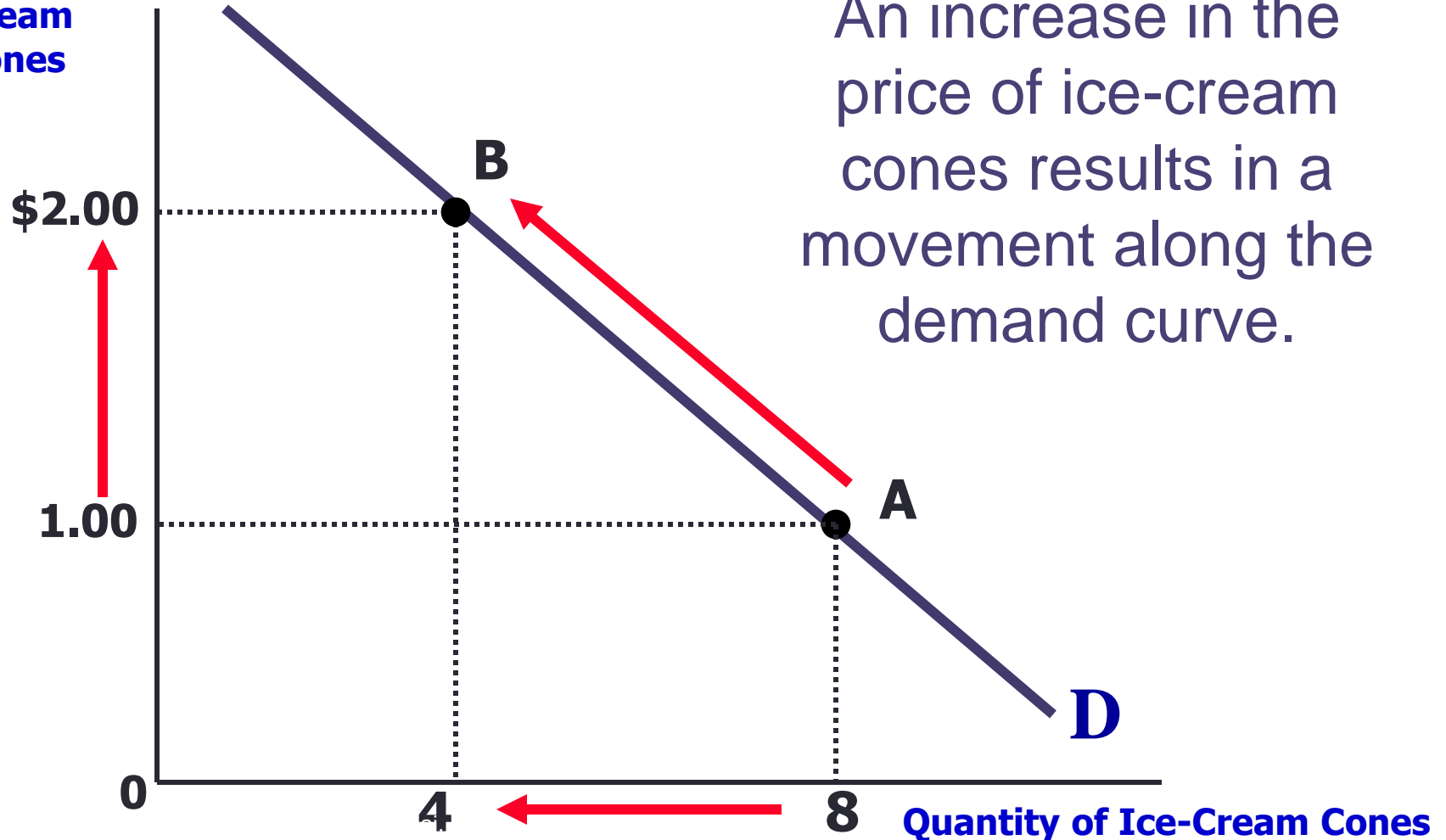


The Demand Curve: The Relationship between Price and Quantity Demanded

- The demand curve illustrates the **quantity demanded** at different price.
- Changes in the price cause changes in the quantity and these changes are captured by movement along the demand curve.

Changes in Quantity Demanded

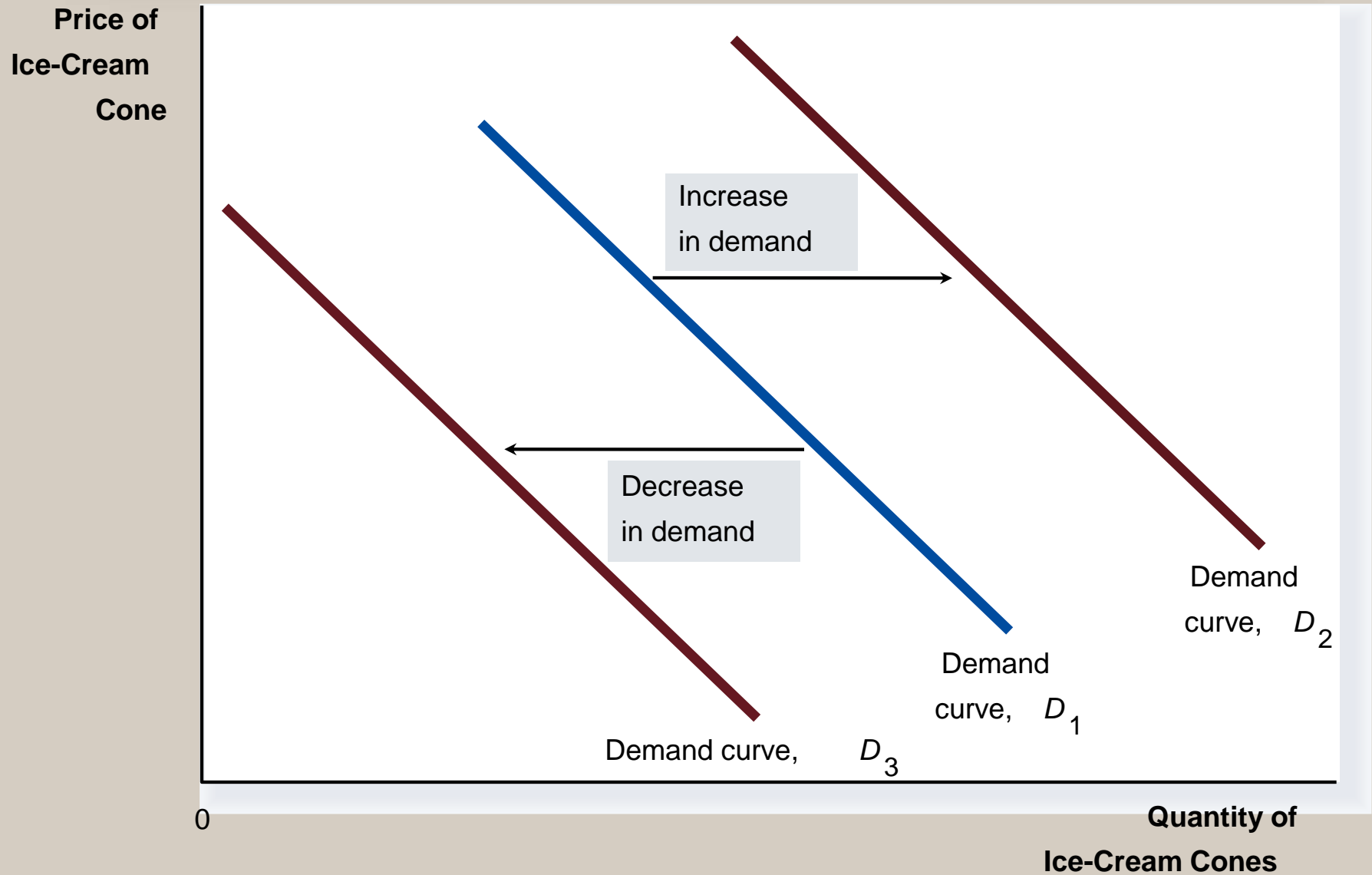
Price of Ice-Cream Cones



Shifts in the Demand Curve

- Shifts in the demand curve are caused by a change in a determinant of the quantity demanded other than price.
 - Consumer income
 - Prices of related goods
 - Tastes
 - Expectations
 - Number of buyers

Figure 3 Shifts in the Demand Curve



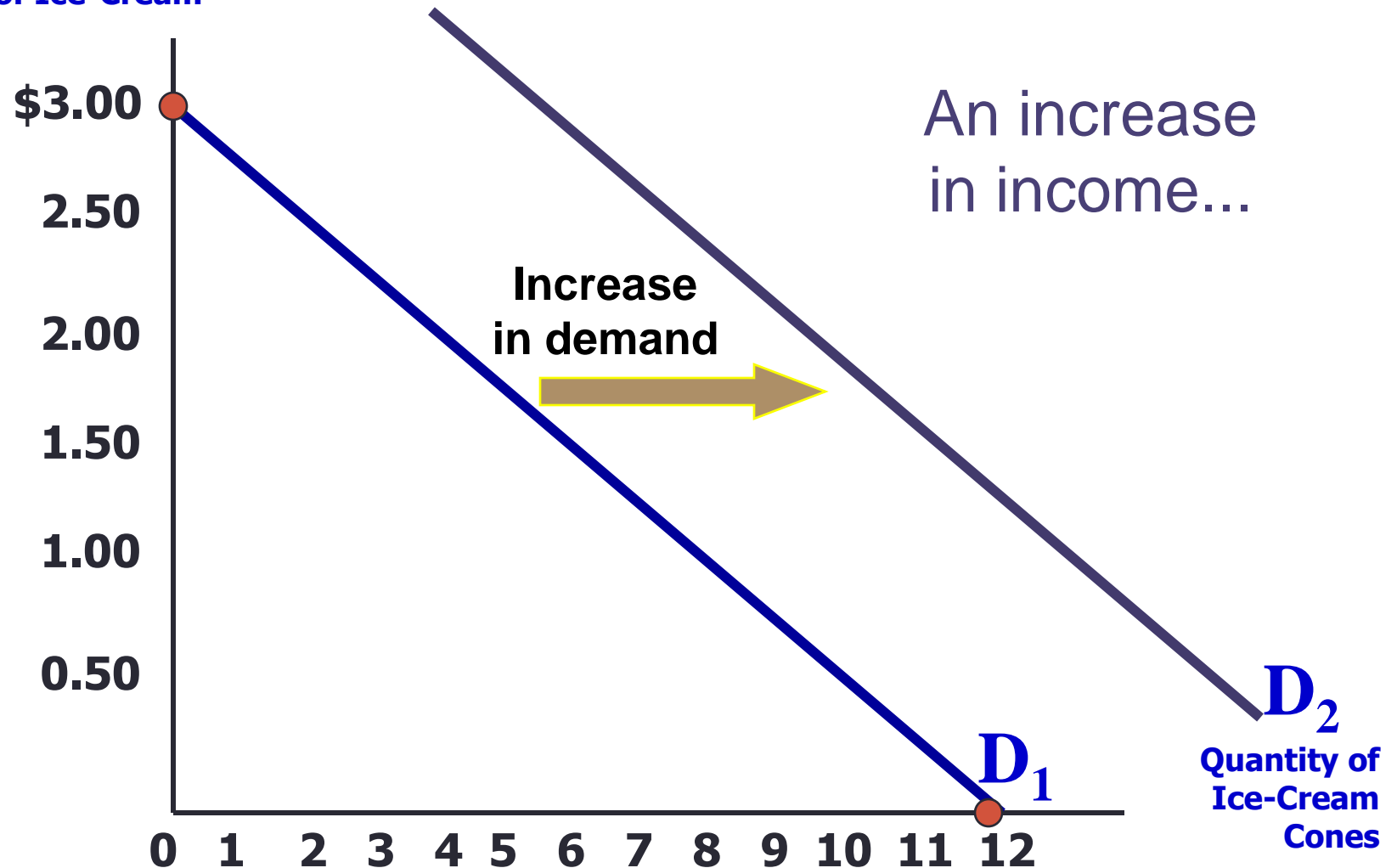
Shifts in the Demand Curve

Consumer Income

- As income increases the demand for a **normal good** will increase.
- As income increases the demand for an **inferior good** will decrease.

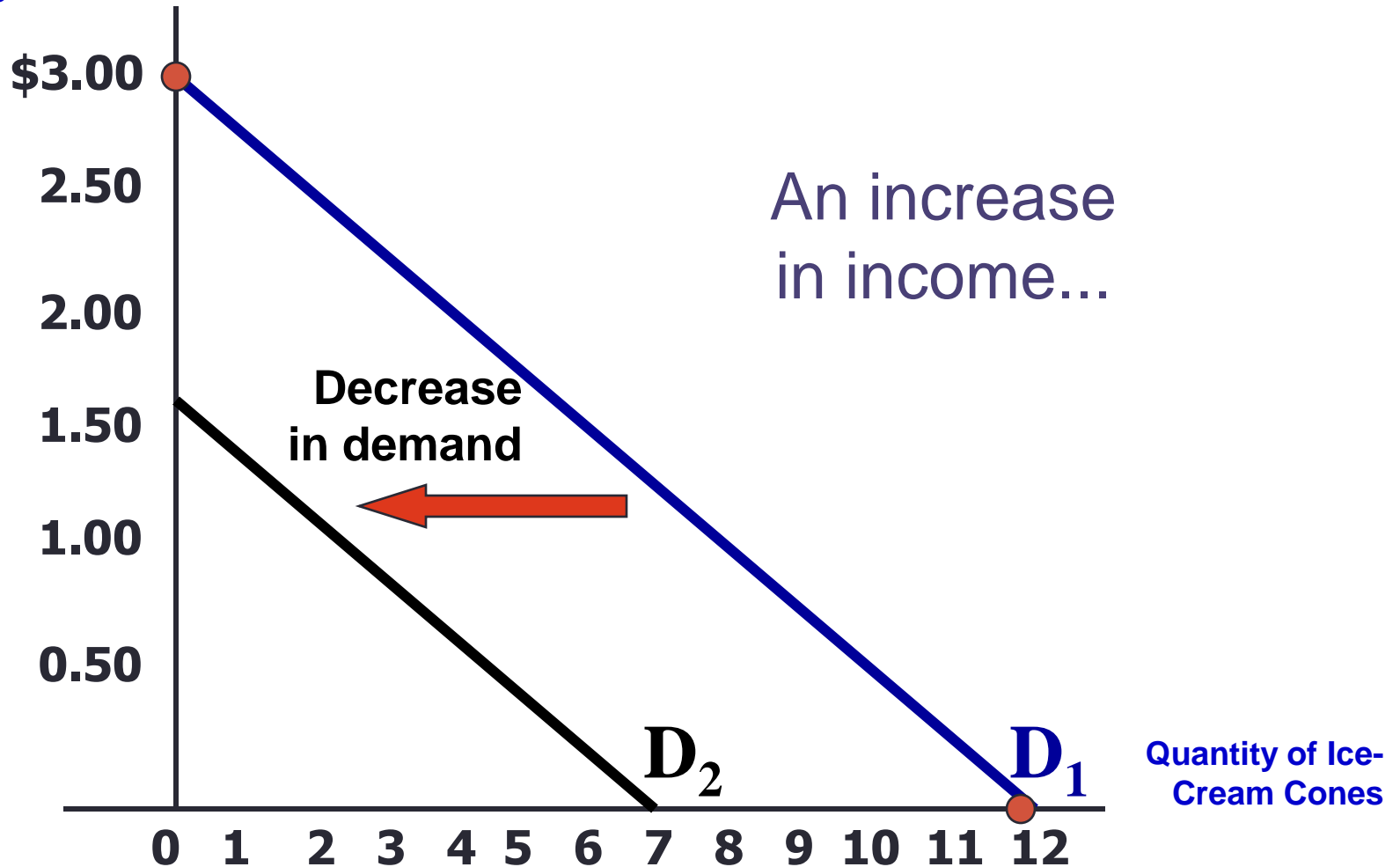
Consumer Income: Normal Good

Price of Ice-Cream
Cone



Consumer Income: Inferior Good

Price of Ice-Cream
Cone



Shifts in the Demand Curve

Prices of Related Goods

- When a fall in the price of one good reduces the demand for another good, the two goods are called **substitutes**.
- When a fall in the price of one good increases the demand for another good, the two goods are called **complements**.

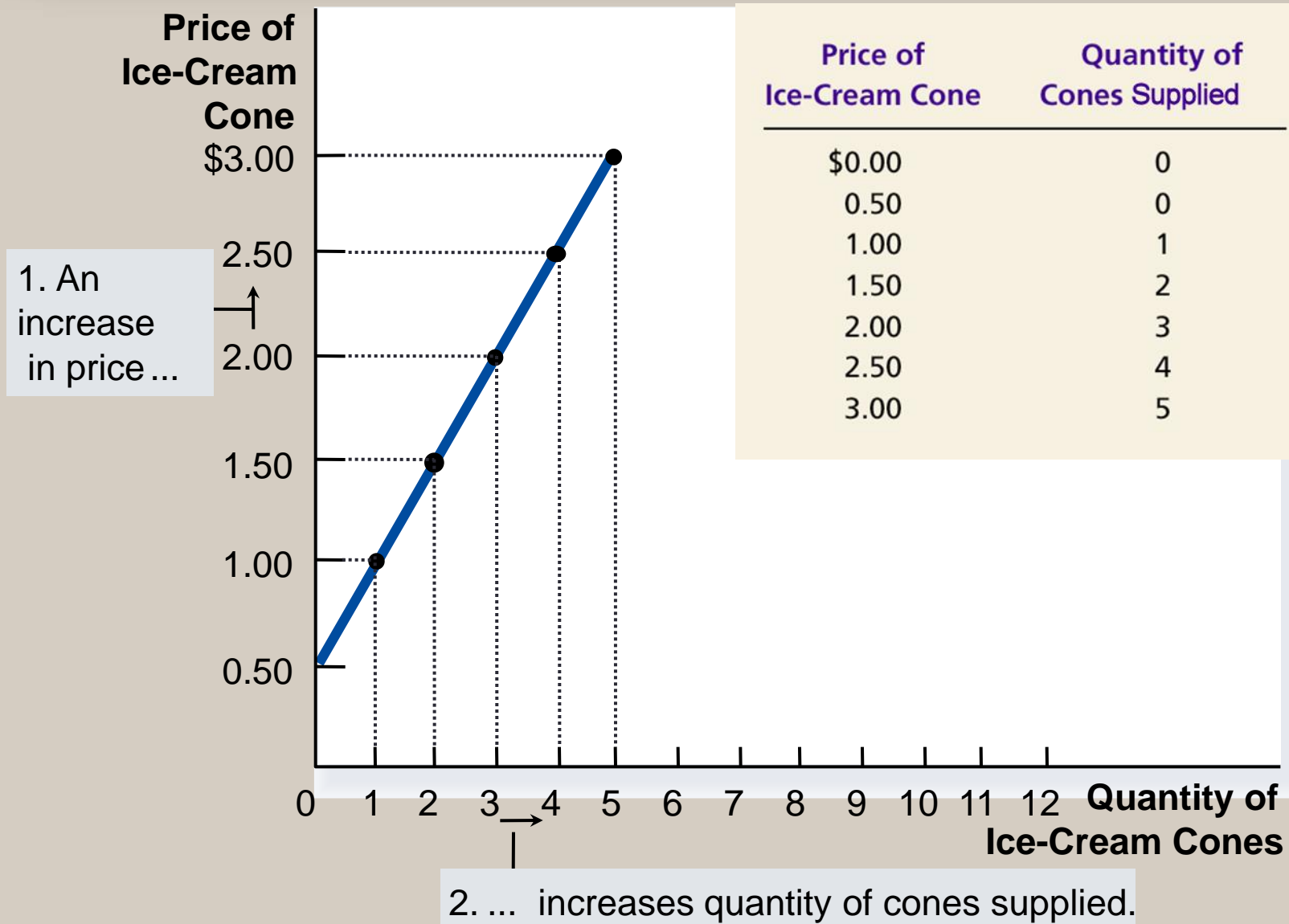
Table 1 Variables That Influence Buyers

Variable	A Change in This Variable . . .
Price	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

- *Quantity supplied* is the amount of a good that sellers are willing and able to sell.
- Law of Supply
 - The *law of supply* states that, other things equal, the quantity supplied of a good rises when the price of the good rises.

Figure 5 Ben's Supply Schedule and Supply Curve



Supply and Opportunity Cost

- For example, assume Kamal tries to decide how to divide his time between his job as a dishwasher making \$6/hour and gathering soft drink containers to redeem for deposit.
- So, his opportunity cost for spending an hour collecting cans is \$6.
- Imagine that in his first hour he will be able to collect 600 cans. In his second hour, he will be able to collect 400 cans (put the total at 1000 cans) and the third hours only 300, and so on.
- This pattern is what we expect given the principle of low-hanging-fruits (or increasing opportunity cost).

Supply and Opportunity Cost

Cans	Additional Cans	Opportunity Cost
0	0	
600	600	$\$6/600 = \0.01
1000	400	$\$6/400 = \0.015
1300	300	$\$6/300 = \0.02
1500	200	$\$6/200 = \0.03
1600	100	$\$6/100 = \0.06

- Interpretation of the calculations: spending the first hour searching for containers has an opportunity cost of \$0.01 per container. Spending the second hour comes at the opportunity cost of \$0.015 per container.

Supply and Opportunity Cost

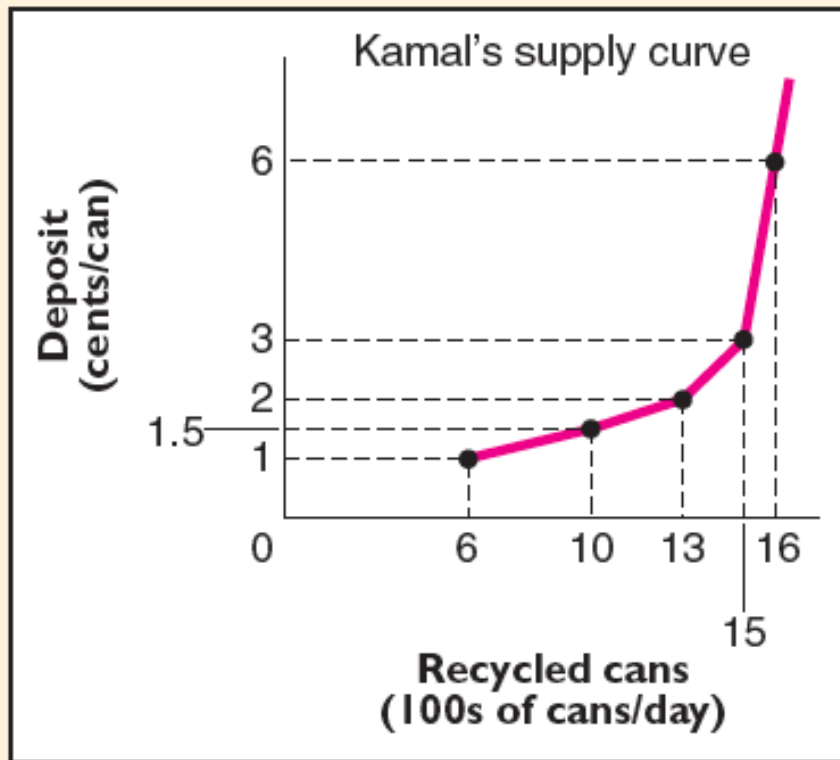


FIGURE 3.5

An Individual Supply Curve for Recycling Services.

When the deposit price increases, it becomes attractive to abandon alternative pursuits to spend more time searching for soft drink containers.

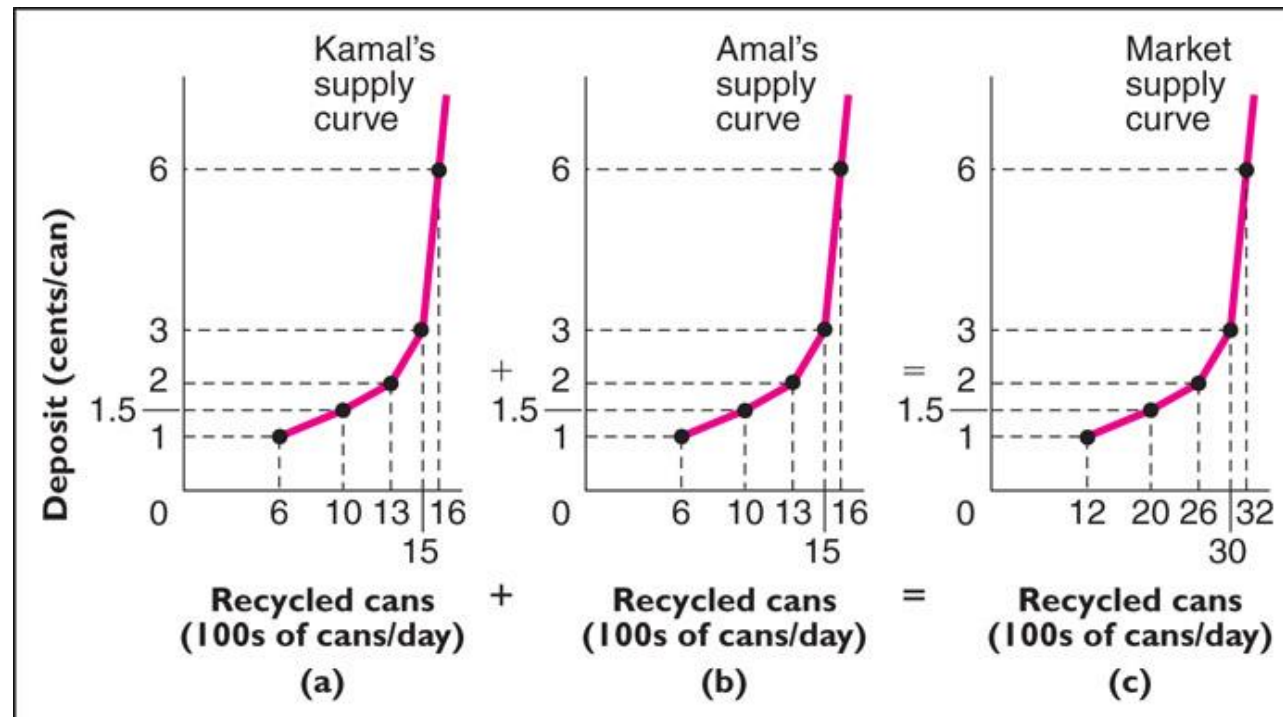
- So, the most likely shape of an individual supply curves is **convex** and upward.

Market Supply versus Individual Supply

- Market supply refers to the sum of all individual supplies for all sellers of a particular good or service.
- Graphically, individual supply curves are summed horizontally to obtain the market supply curve.

Supply: Individual v. Market

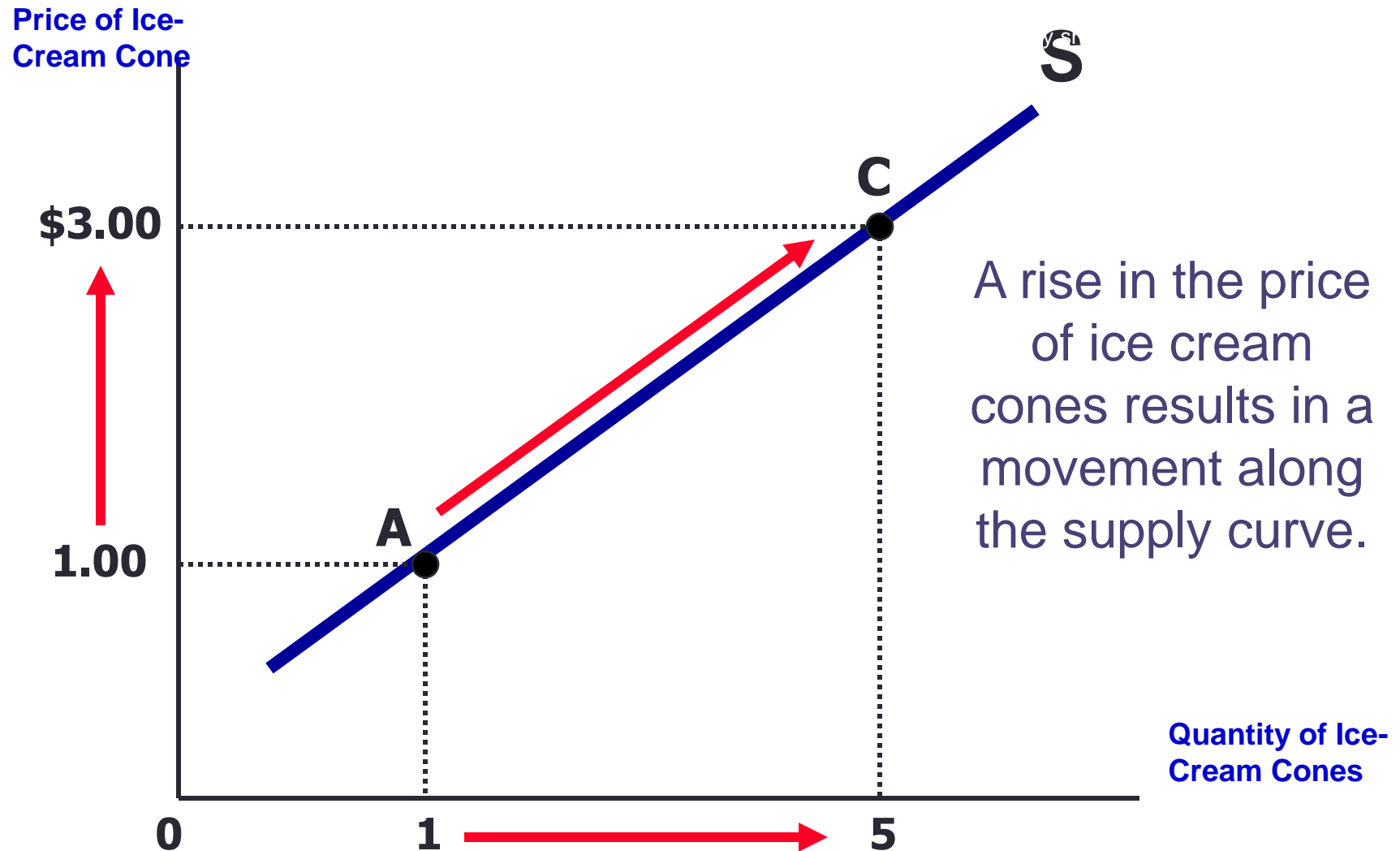
- Horizontal summation = adding quantities at fixed prices



Supply Curve

- The supply curve illustrates the **quantity supplied** at different price.
- It captures movement along the supply curve as the prices changes.

Change in Quantity Supplied



Shifts in the Supply Curve

- Shifts in the supply curve caused by a change in a determinant of the quantity supplied other than price.
 - Input prices
 - Technology
 - Expectations
 - Number of sellers

Figure 7 Shifts in the Supply Curve

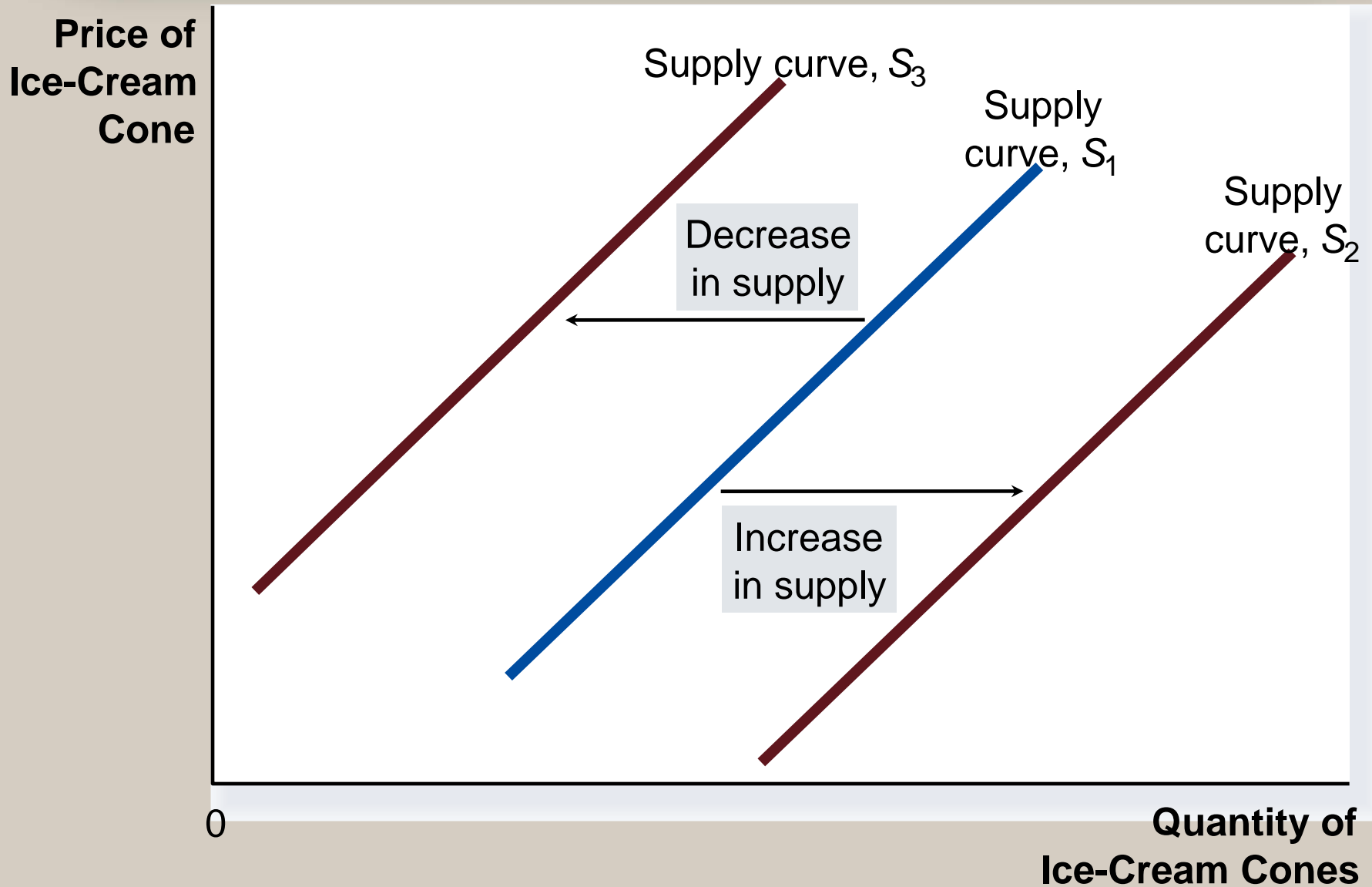


Table 2 Variables That Influence Sellers

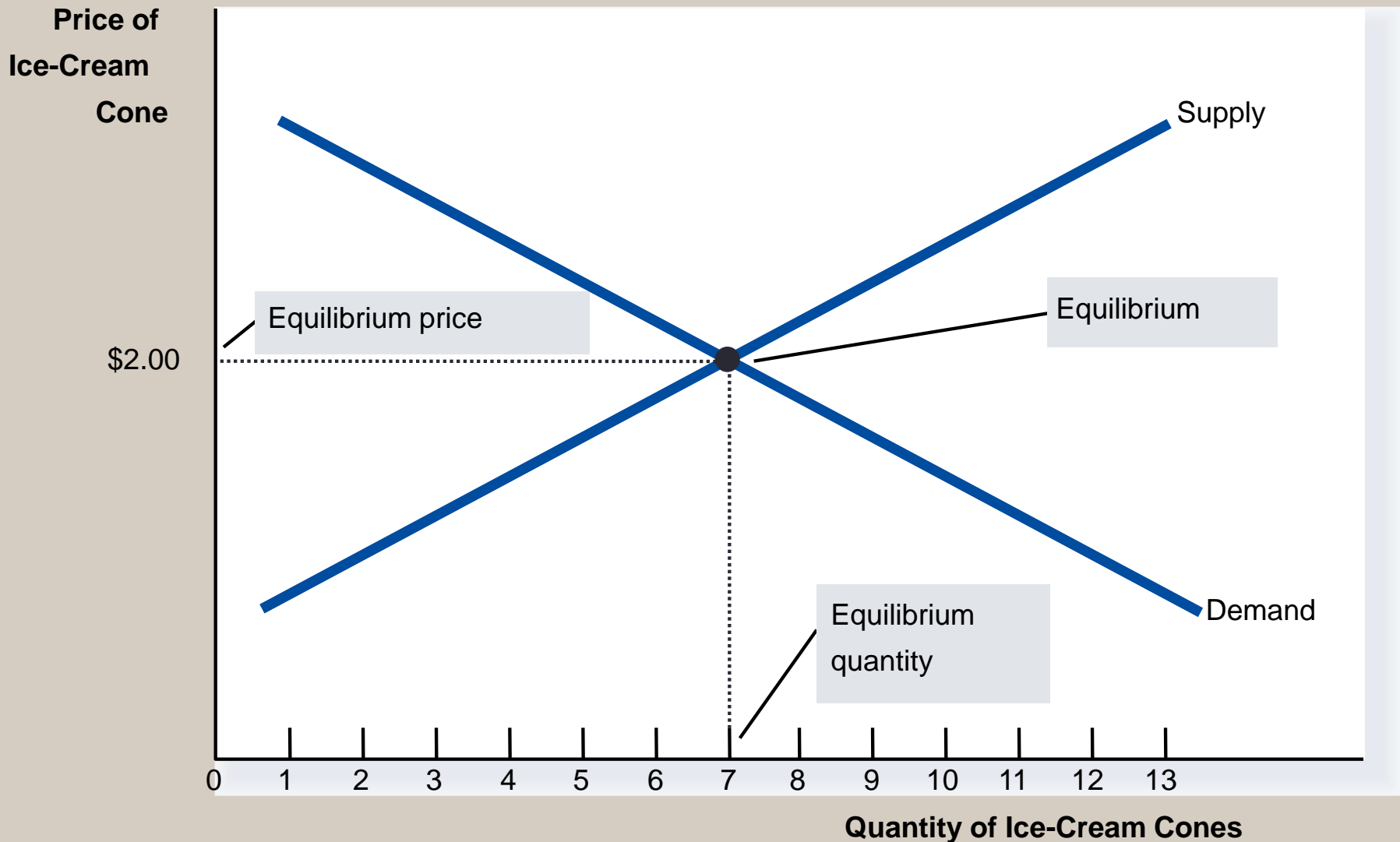
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Variable	A Change in This Variable . . .
Price	Represents a movement along the supply curve
Input prices	Shifts the supply curve
Technology	Shifts the supply curve
Expectations	Shifts the supply curve
Number of sellers	Shifts the supply curve

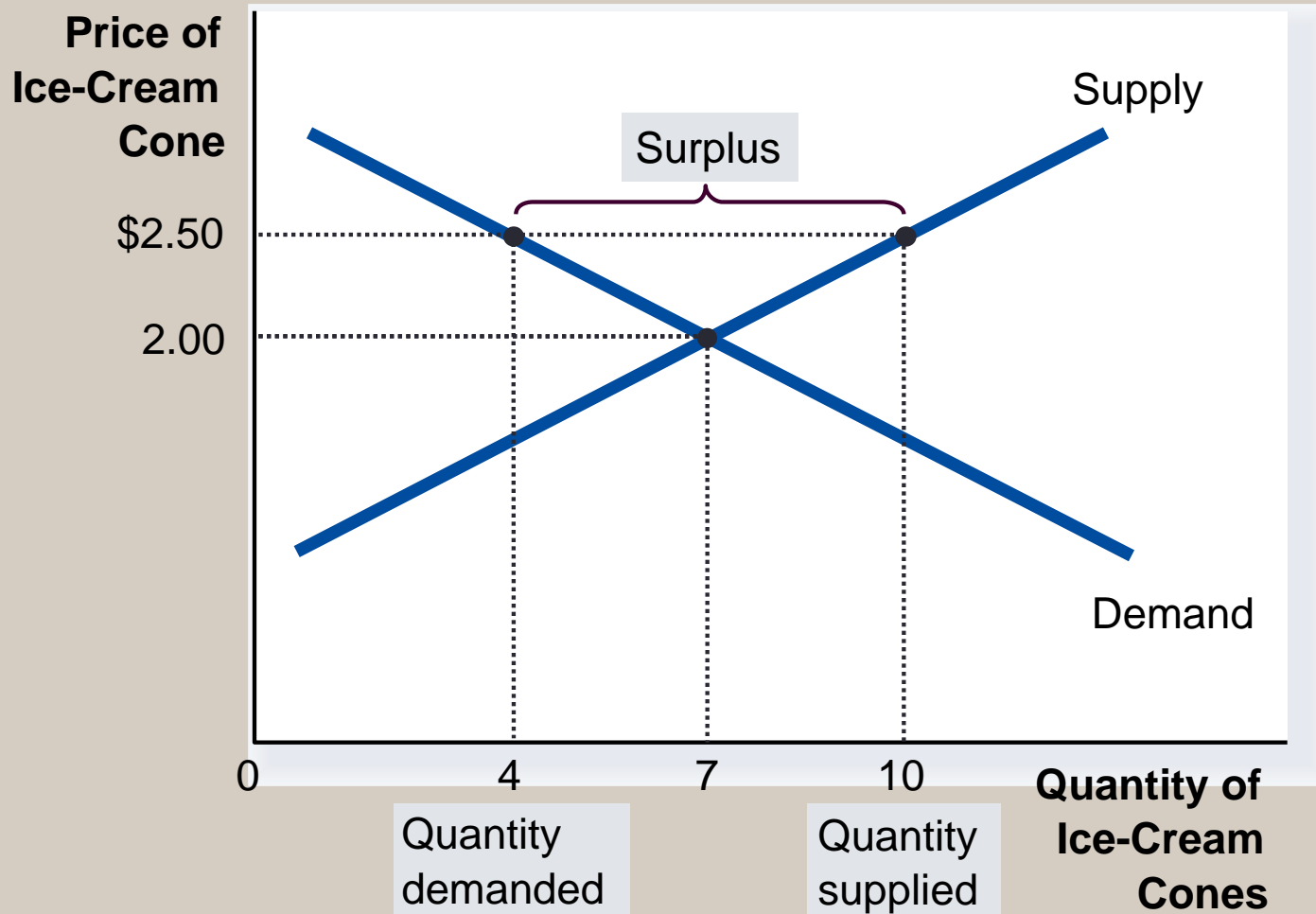
SUPPLY AND DEMAND TOGETHER

- **Equilibrium** refers to a situation in which the price has reached the level where quantity supplied equals quantity demanded. This condition is known as the market clearing condition, too.
- A market equilibrium has two components:
 - Equilibrium Price
 - Equilibrium Quantity (which is either $Q_D = Q_S$)

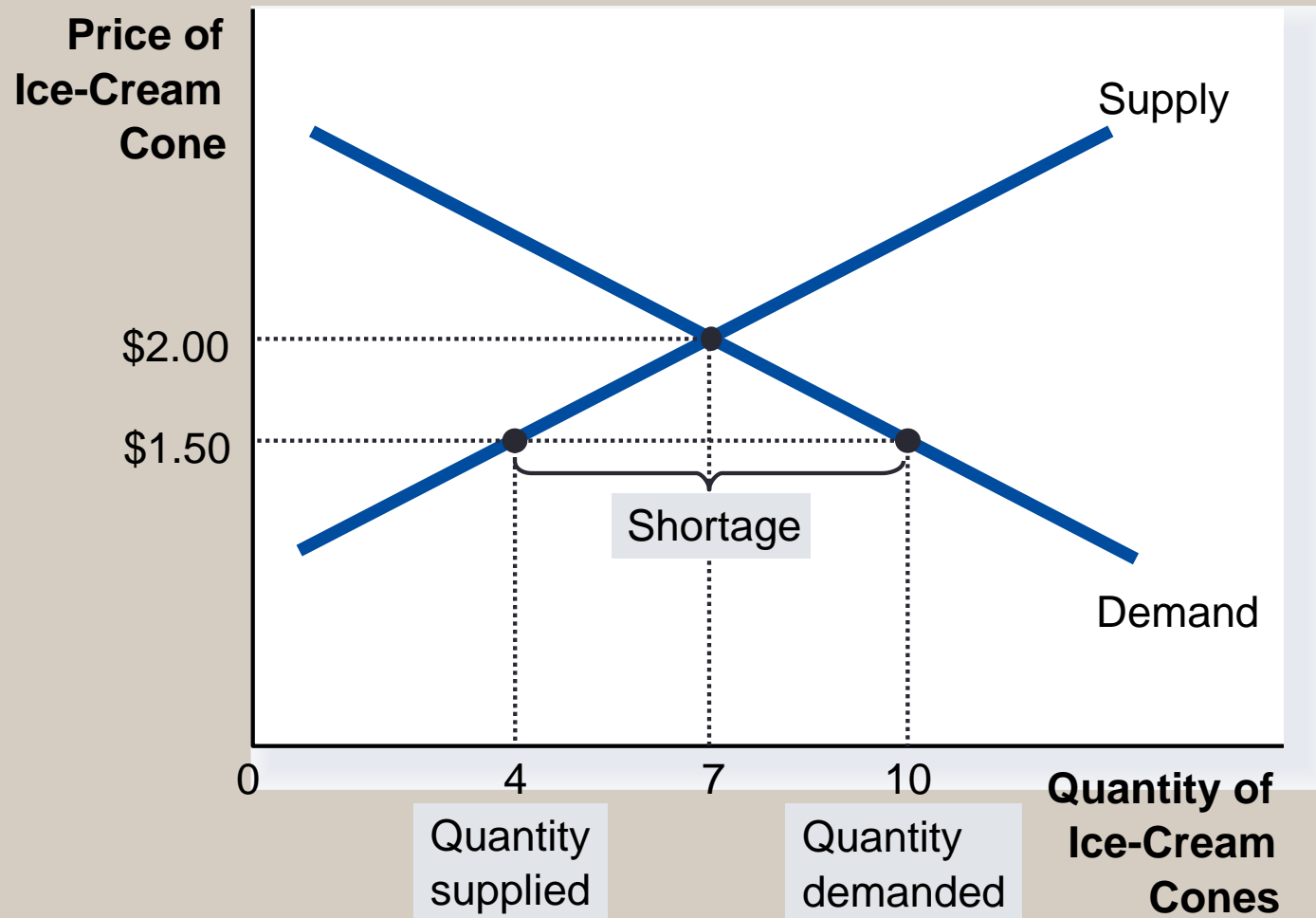
Figure 8 The Equilibrium of Supply and Demand



(a) Excess Supply



(b) Excess Demand



Equilibrium

Law of supply and demand

- The claim that the price of any good adjusts to bring the quantity supplied and the quantity demanded for that good into balance.
- It says that equilibrium happens when the price adjusts to the level that market clearing condition is satisfied

Three Steps to Analyzing Changes in Equilibrium

- I. Decide whether the event shifts the supply or demand curve (or both).
- II. Decide whether the curve(s) shift(s) to the left or to the right.
- III. Use the supply-and-demand diagram to see how the shift affects equilibrium price and quantity.

Figure 10 How an Increase in Demand Affects the Equilibrium

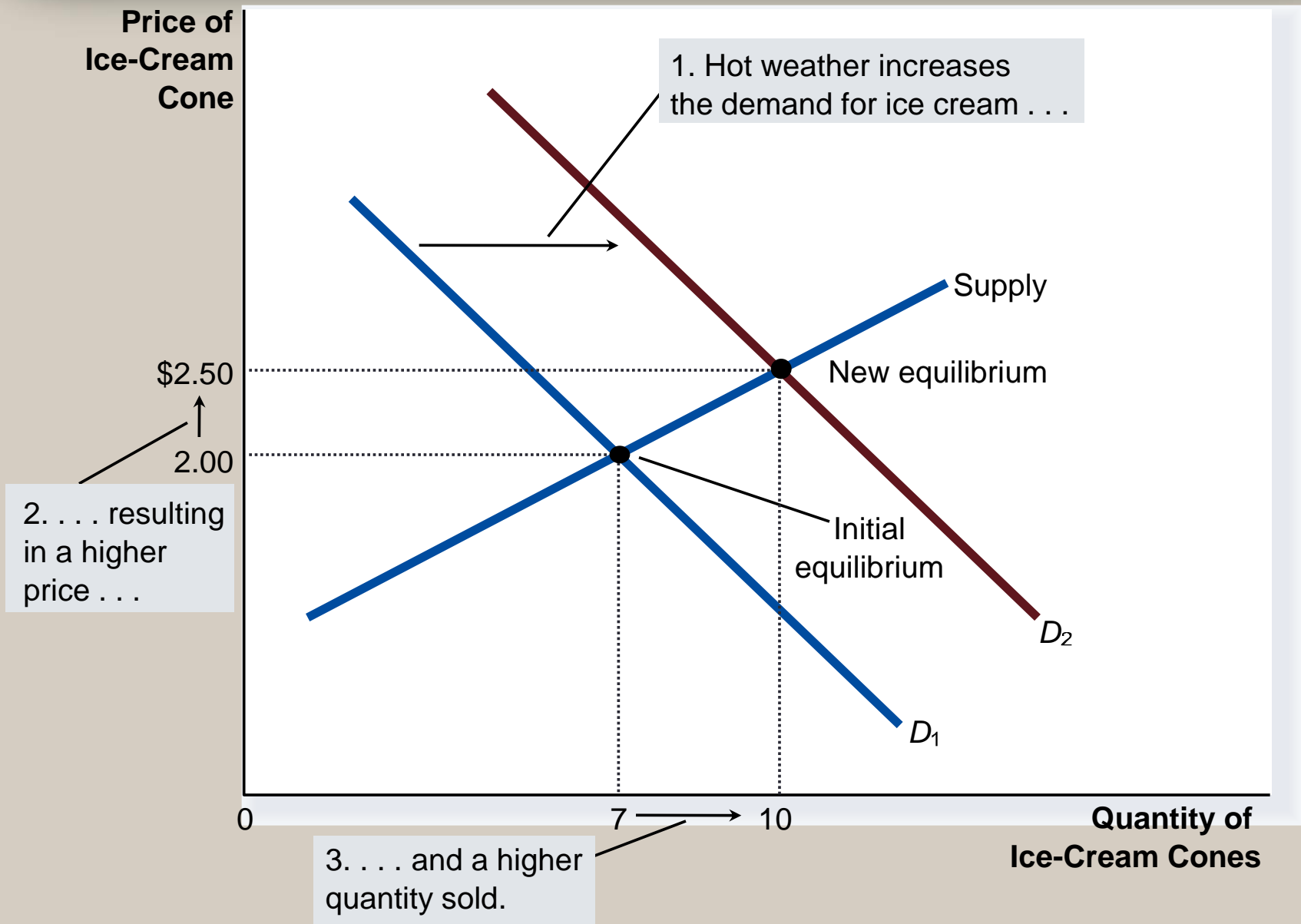


Figure 11 How a Decrease in Supply Affects the Equilibrium

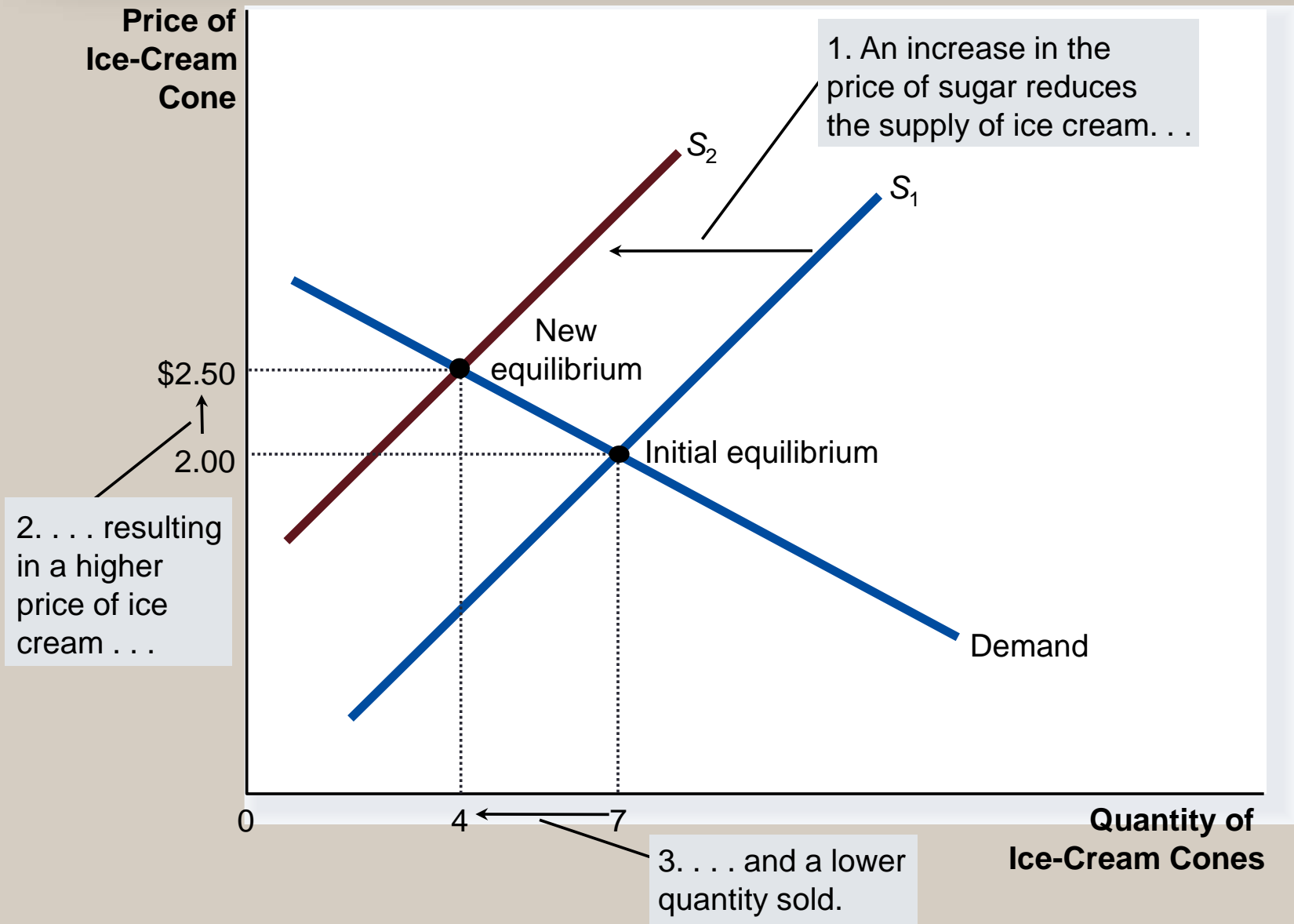


Table 4 What Happens to Price and Quantity When Supply or Demand Shifts?

	No Change in Supply	An Increase in Supply	A Decrease in Supply
No Change in Demand	<i>P</i> same <i>Q</i> same	<i>P</i> down <i>Q</i> up	<i>P</i> up <i>Q</i> down
An Increase in Demand	<i>P</i> up <i>Q</i> up	<i>P</i> ambiguous <i>Q</i> up	<i>P</i> up <i>Q</i> ambiguous
A Decrease in Demand	<i>P</i> down <i>Q</i> down	<i>P</i> down <i>Q</i> ambiguous	<i>P</i> ambiguous <i>Q</i> down

From Graphs to Equations ...

Example: Market Equations

- Demand curve

$$Q_D = 8 - P/2 \quad \text{or} \quad P = 16 - 2Q_D$$

This is a straight-line (inverse) demand curve with intercept 16 on the vertical (P) axis and a slope of -2.

- Supply curve

$$Q_S = -1 + P/4 \quad \text{or} \quad P = 4 + 4Q_S$$

This is a straight-line (inverse) supply curve with intercept 4 and a slope of 4.

... To Equilibrium P and Q

- Equilibrium is where market clearing condition is satisfied. That is at the price where $Q_D = Q_S$.
- Thus, to determine the equilibrium price, we set the two equations equal to each other ($Q_D = Q_S$) and solve for P.

$$8 - P/2 = -1 + P/2$$

$$(3/4)P = 9$$

$$\boxed{P = 12}$$

- Use either the supply or demand curve and $P = 12$ to find the quantity:

$$Q_D = 8 - 12/2 = 2 \quad \text{or} \quad Q_S = -1 + 12/4 = 2$$

$$\boxed{Q_D = Q_S = 2}$$