Demand, Supply, and Market Equilibrium

Theories and Predictions

- We need to be able to predict the consequences of
  - alternative policies, and
  - events that may be outside our control
- The mental tool we use to make such predictions is called a ***theory***
- A theory is of no use if its predictions are inaccurate

We need a Theory of Prices

- The theory of demand and supply is a simple example of an economic theory
- It can be used to make predictions about the price and quantity of some commodity
- In a free-market economy, most economic decisions are guided by prices
- Therefore, without a reliable theory of prices, you will get nowhere in economic analysis

Assume Perfect Competition

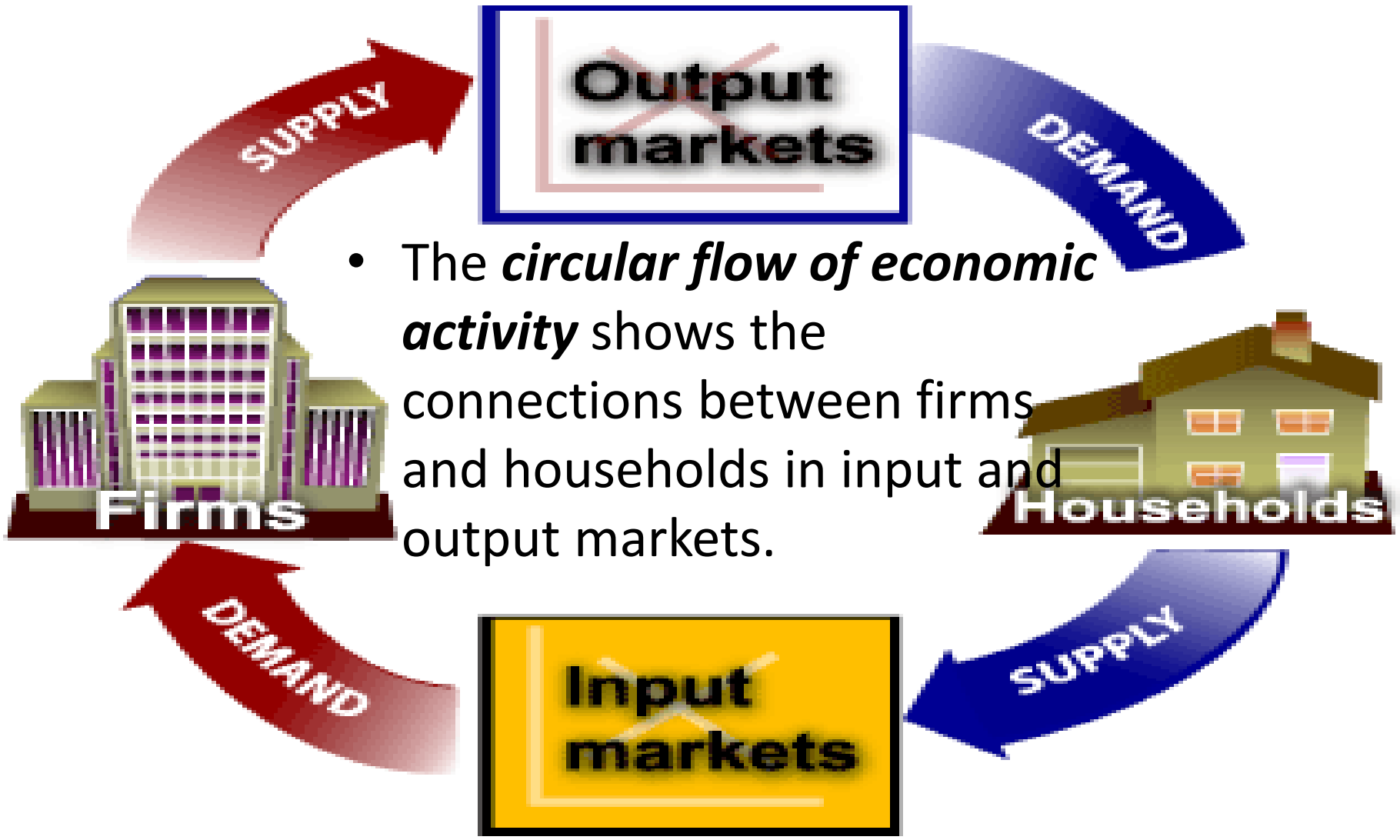
- The theory of supply and demand assumes that commodities are traded in perfectly competitive markets
- A *perfectly competitive market* is a market in which
  - there are many buyers
  - many sellers
  - and all sellers sell the exact same product
- As a result, each buyer and seller has a negligible impact on the market price

The Basic Decision-Making Units

Market Participants

- All participants, for the most part, are trying to obtain the maximum return from the scarce resources they have.
  - **Consumers:** maximize the utility (satisfaction of unmet wants) they can get from available incomes.
  - **Businesses:** maximize profits by selling goods that satisfy while keeping costs low.
  - **Government:** maximize the general welfare of society.
- These motives explain most market activity.

The Circular Flow of Economic Activity



- The ***circular flow of economic activity*** shows the connections between firms and households in input and output markets.

Supply and Demand

- The goal of this unit is to explain how supply and demand really work.
  - What determines the price of a good or service?
  - How does the price of a product affect its production and consumption?
  - Why do prices and production levels often change?

Learning Objectives

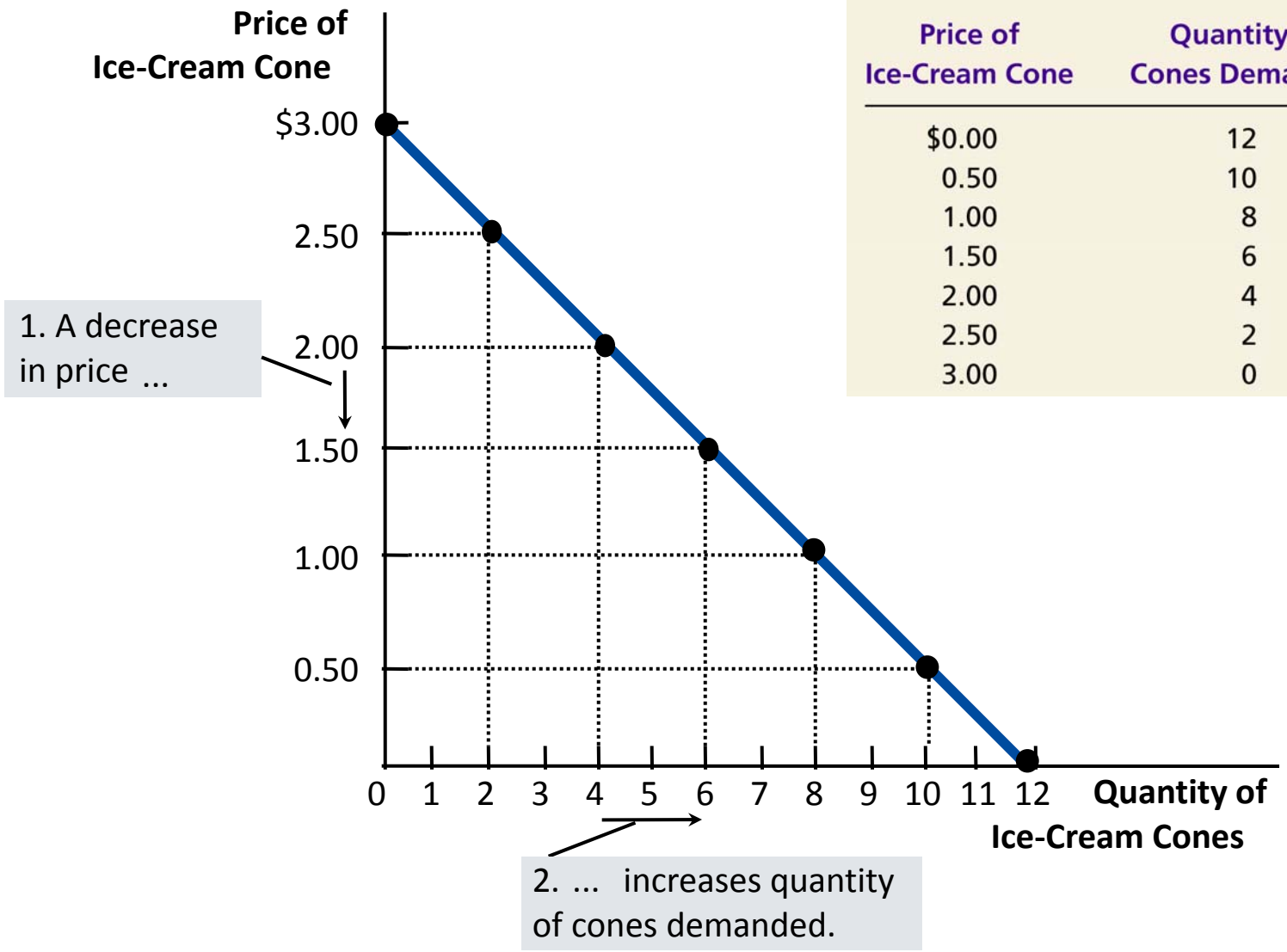
- Know the nature and determinants of market demand.
- Know the nature and determinants of market supply.
- Know how market prices are established.
- Know what causes market prices to change.
- Know how government price controls affect market outcomes.

DEMAND

Demand

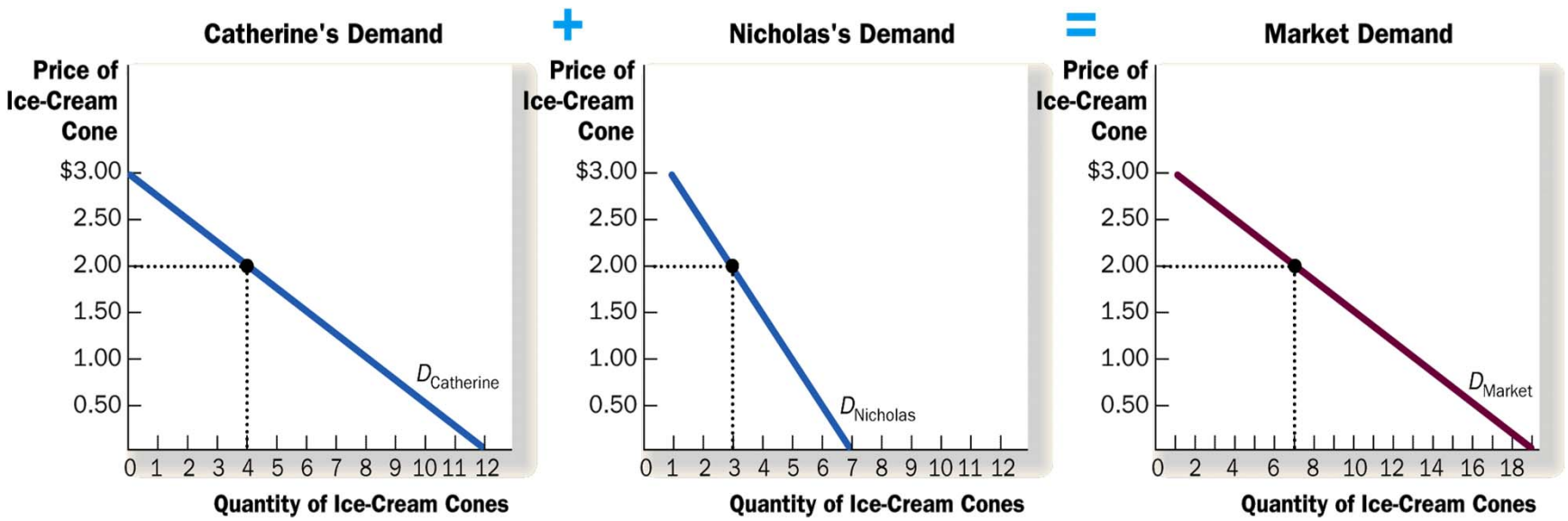
- **Demand vs. Need**
- Effective Demand
  - Desire to have a good/commodity
  - Willingness to pay
  - Ability to pay
- **Quantity demanded** is the amount of a good that buyers are willing and able to purchase
- **Demand** is a full description of how the quantity demanded changes as the price of the good changes.

Catherine's Demand Schedule and Demand Curve



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

Market Demand is the Sum of Individual Demands



Law of Demand

- The law of demand states that
  - **the quantity demanded of a good falls when the price of the good rises**, and vice versa, provided all other factors that affect buyers' decisions are unchanged
  - Inverse relationship between price (P) and quantity demanded (Qd).
  - A downward-sloping curve on a market diagram.

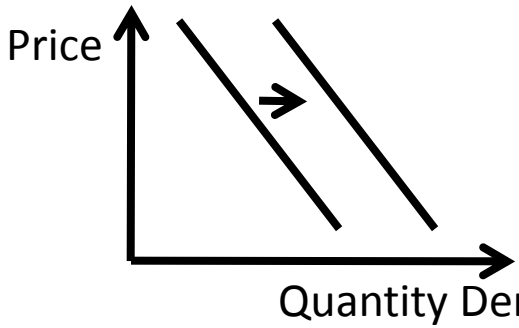
"provided all other factors … are unchanged"

- That's an important phrase in the wording of the Law of Demand
- The quantity demanded of a consumer good such as ice cream depends on
  - The price of ice cream
  - The prices of related goods
  - Consumers' incomes
  - Consumers' tastes
  - Consumers' expectations about future prices and incomes
  - Number of buyers, etc
- The Law of Demand says that the quantity demanded of a good is inversely related to its price, *provided* all other factors are unchanged

Why Might Demand Increase?

	Quantity Demanded	
Price	Situation *A*	Situation *B*
0.00	12	20
0.50	10	16
1.00	8	12
1.50	6	8
2.00	4	6
2.50	2	4
3.00	0	2

- How can we explain the difference in Catherine's behavior in situations *A* and *B*?
- Why does she consume more in situation *B at every possible price*?



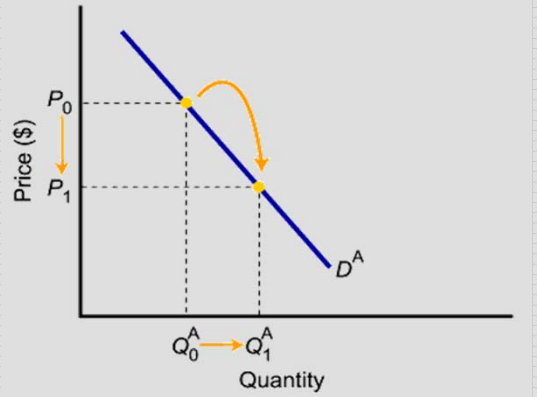
Shifts in the Market Demand Curve

- … are caused by changes in:
  - Consumer income
  - Prices of related goods
  - Tastes
  - Expectations, say, about future prices and prospects
  - Number of buyers

A Change in Demand Versus a Change in Quantity Demanded

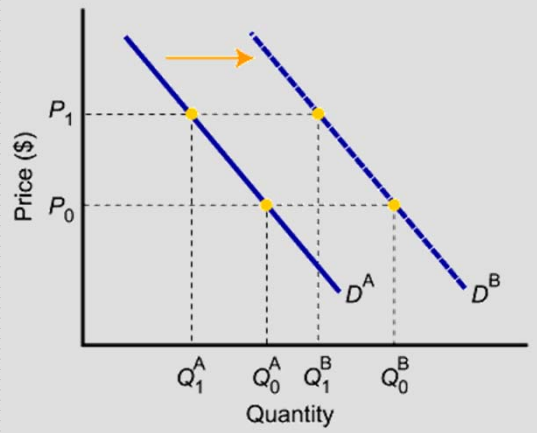
Change in price of a good or service leads to

Change in *quantity demanded* (**Movement along the curve**).

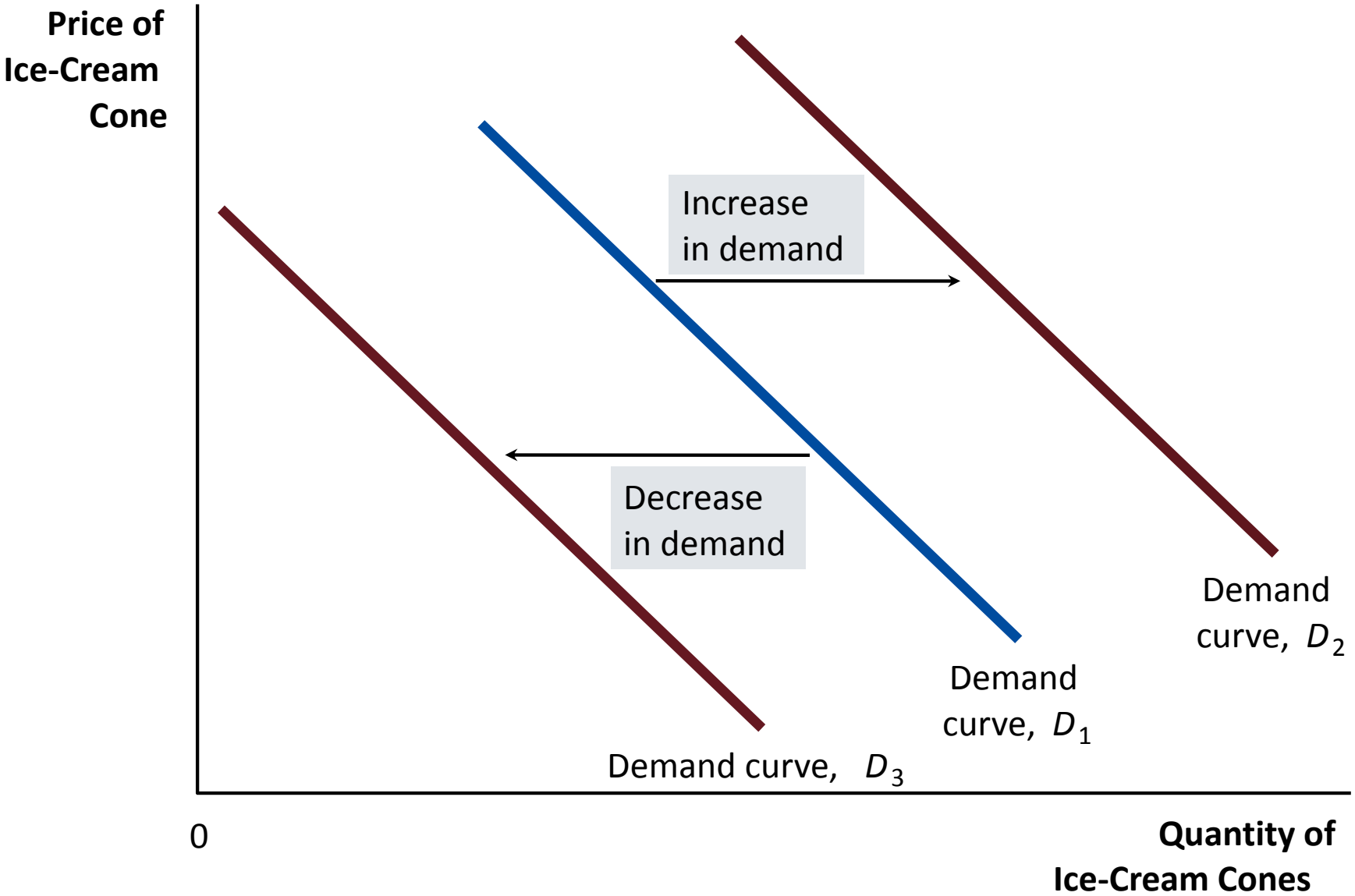


Change in income, preferences, or prices of other goods or services leads to

Change in demand (**Shift of curve**).



Shifts in the Demand Curve

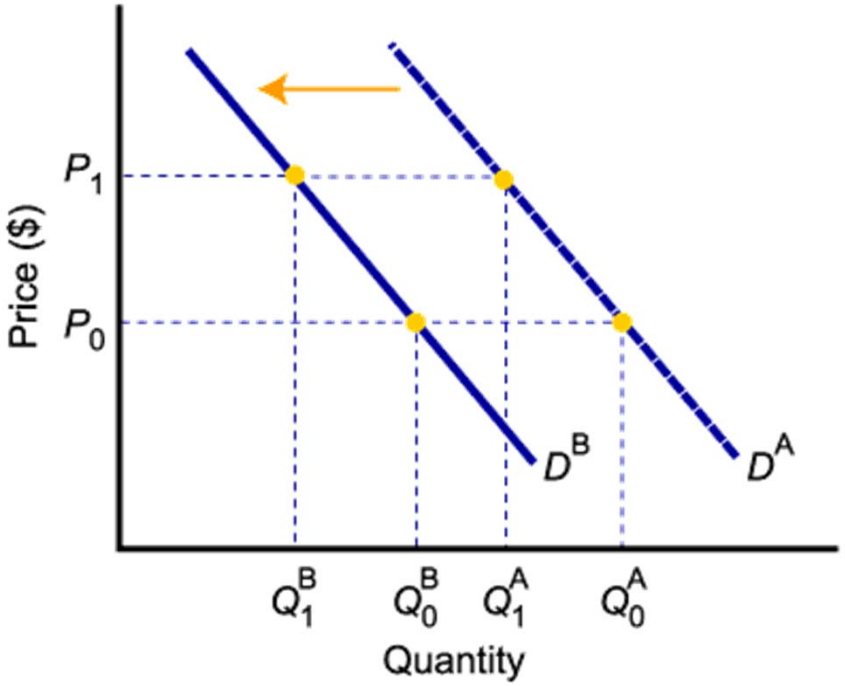


Shifts in the Demand Curve

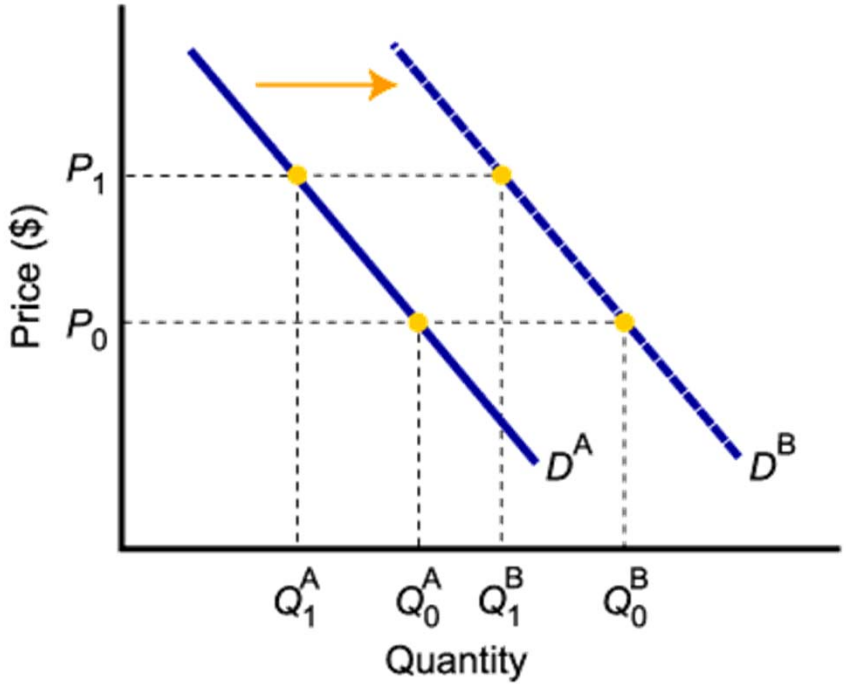
- Consumer Income
  - As income increases the demand for a *normal good* will increase
  - As income increases the demand for an *inferior good* will decrease
- Prices of Related Goods
  - When a fall in the price of one good reduces the demand for another good, the two goods are called *substitutes*
  - When a fall in the price of one good increases the demand for another good, the two goods are called *complements*

The Impact of a Change in Income

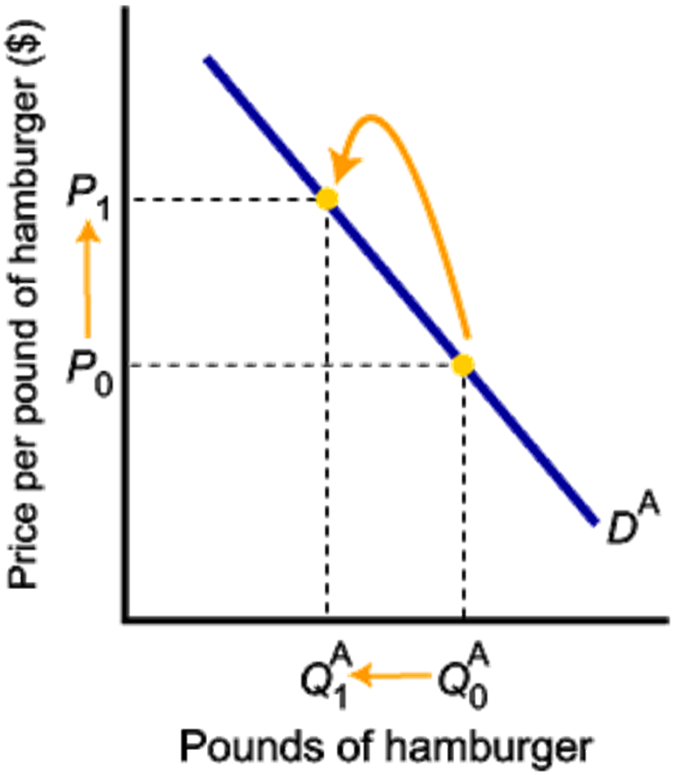
- **Higher income decreases the demand for an *inferior* good**



- **Higher income increases the demand for a *normal* good**

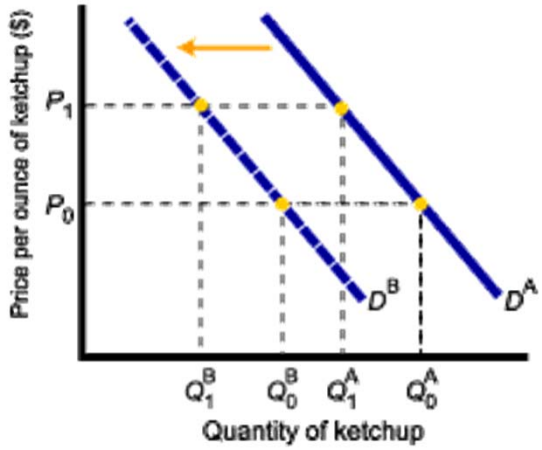


The Impact of a Change in the Price of Related Goods

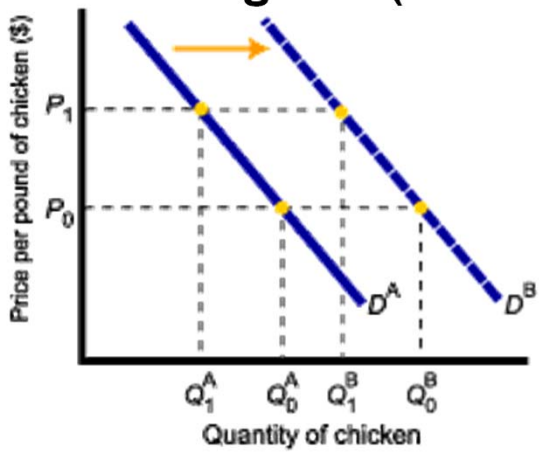


- Price of hamburger rises
- Quantity of hamburger demanded falls

- Demand for **complement** good (ketchup) shifts left



- Demand for **substitute** good (chicken) shifts right



The Law of Demand—Explanations

- There are two ways to explain the Law of Demand
  - Substitution effect
  - Income effect

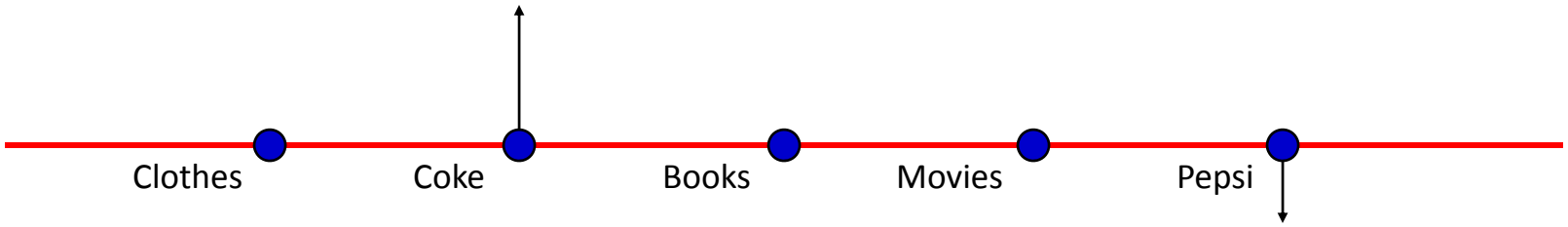
Substitution Effect

- When the price of a good decreases, consumers substitute that good instead of other competing (substitute) goods

1. When the price of Coke decreases…

2. Consumption of Pepsi decreases…

3. Consumption of Coke increases



Income Effect

- A decrease in the price of a commodity is essentially equivalent to an increase in consumers' income

Lower Prices = Higher Income

Situation *A*	
Price of an Apple	$1.00
Price of an Orange	$2.00
Income	$10.00

If prices fall, Situation *A* becomes Situation *C*.

Situation *C*	
Price of an Apple	$0.50
Price of an Orange	$1.00
Income	$10.00

If income rises, Situation *A* becomes Situation *B*.

Situation *B*	
Price of an Apple	$1.00
Price of an Orange	$2.00
Income	$20.00

Q: Which change is better?

A: They are both equally desirable. **A fall in prices is equivalent to an increase in income.**

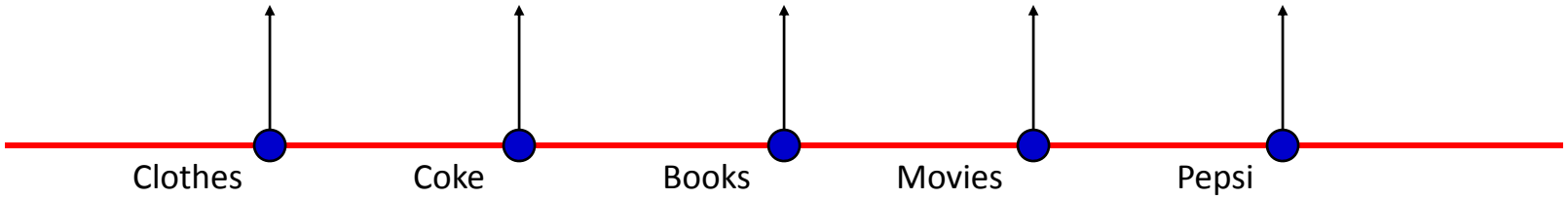
Income Effect

- Consumers respond to a decrease in the price of a commodity as they would to an increase in income
- They increase their consumption of a wide range of goods, including the good that had a price decrease

1. When the price of Coke decreases…

2. Consumers feel richer…

3. Consumption of Coke and other goods increases



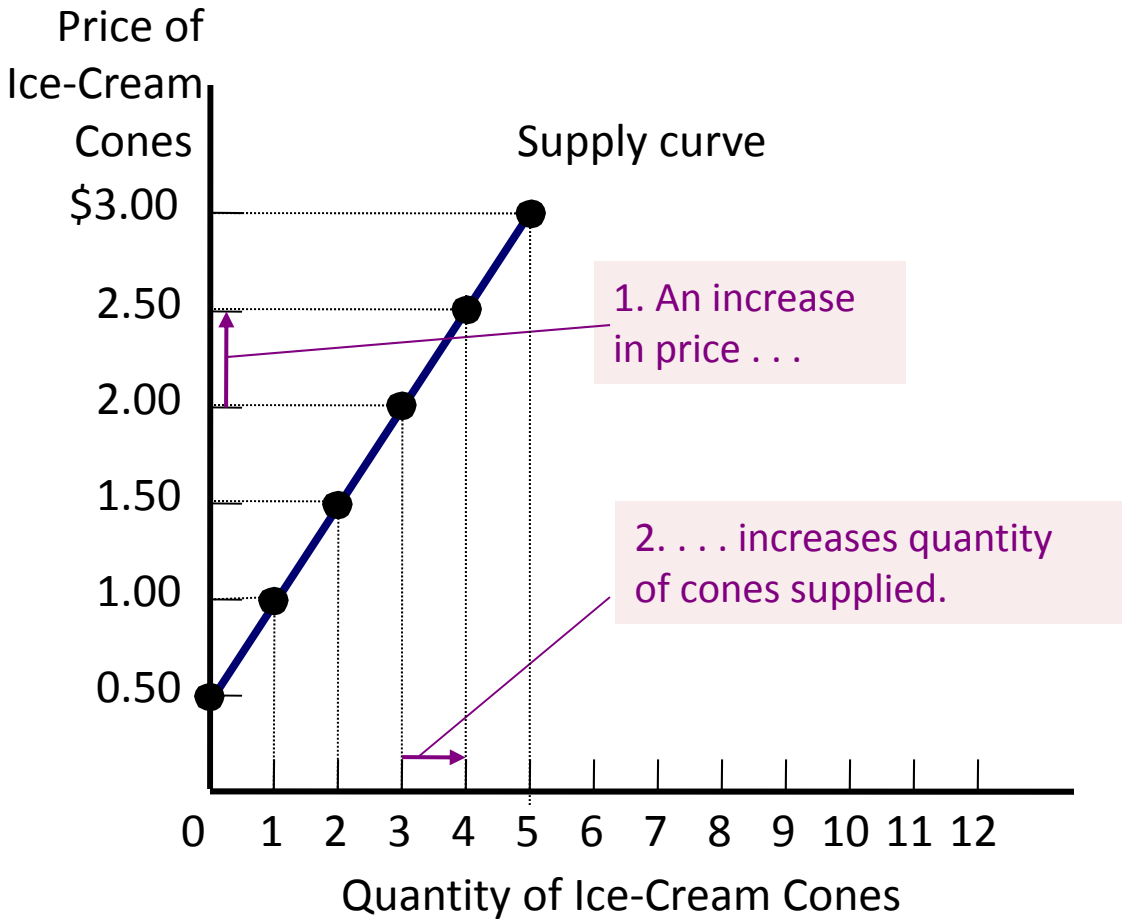
SUPPLY

SUPPLY

- *Quantity supplied* is the amount of a good that sellers are willing and able to sell
- *Supply* is a full description of how the quantity supplied of a commodity responds to changes in its price

Ben's Supply Schedule and Supply Curve

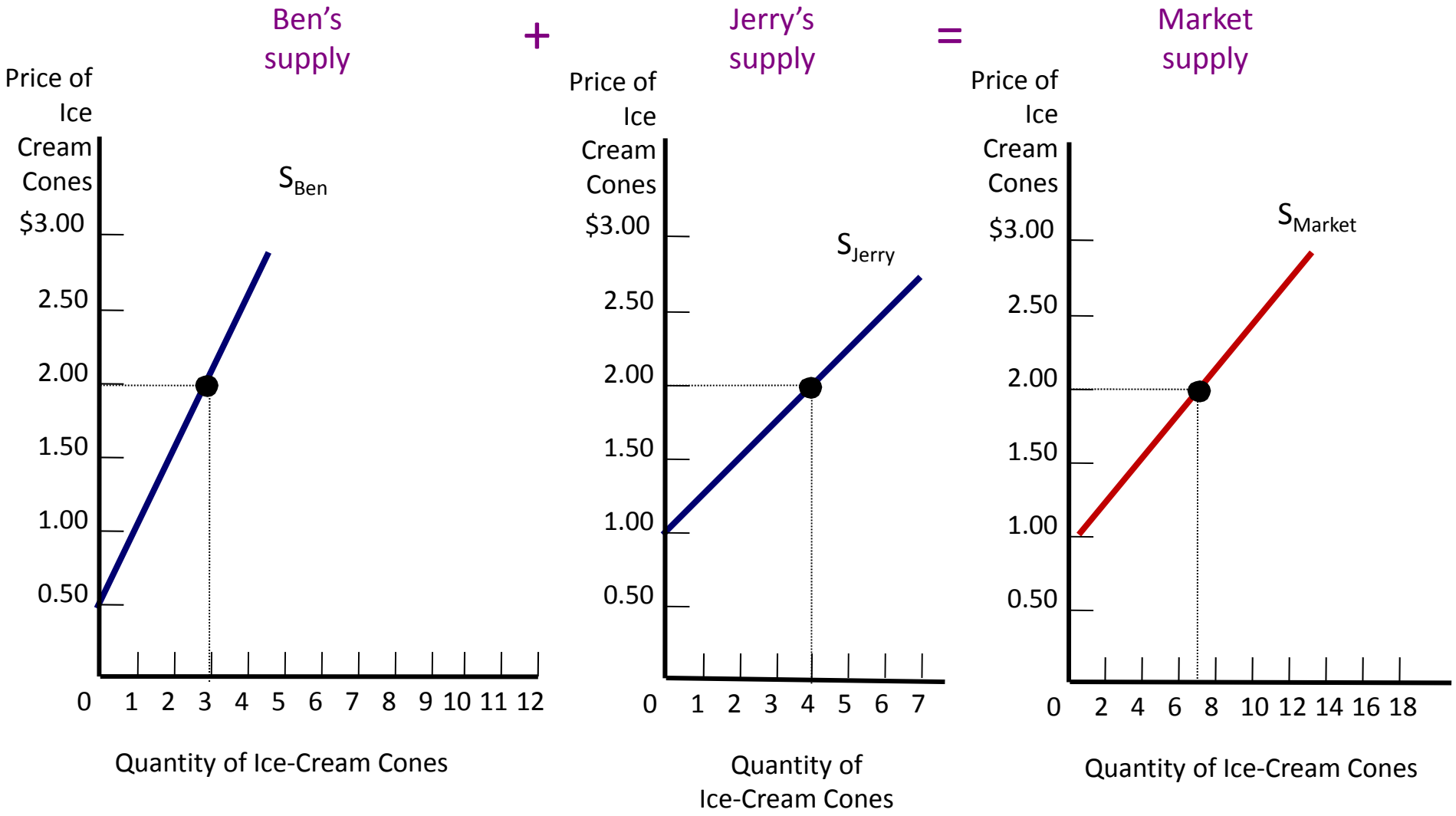
Price of Ice-cream cone	Quantity of Cones supplied
$0.00	0 cones
0.50	0
1.00	1
1.50	2
2.00	3
2.50	4
3.00	5



Market Supply and Individual Supplies

Price of ice-cream cone	Ben		Jerry		Market
$0.00	0	+	0	=	0
0.50	0		0		0
1.00	1		0		1
1.50	2		2		4
2.00	3		4		7
2.50	4		6		10
3.00	5		8		13

Market Supply and Individual Supplies



Law of Supply

- The *law of supply* states that, **the quantity supplied of a good rises when the price of the good rises**, as long as all other factors that affect suppliers' decisions are unchanged

Law of Supply—Explanation

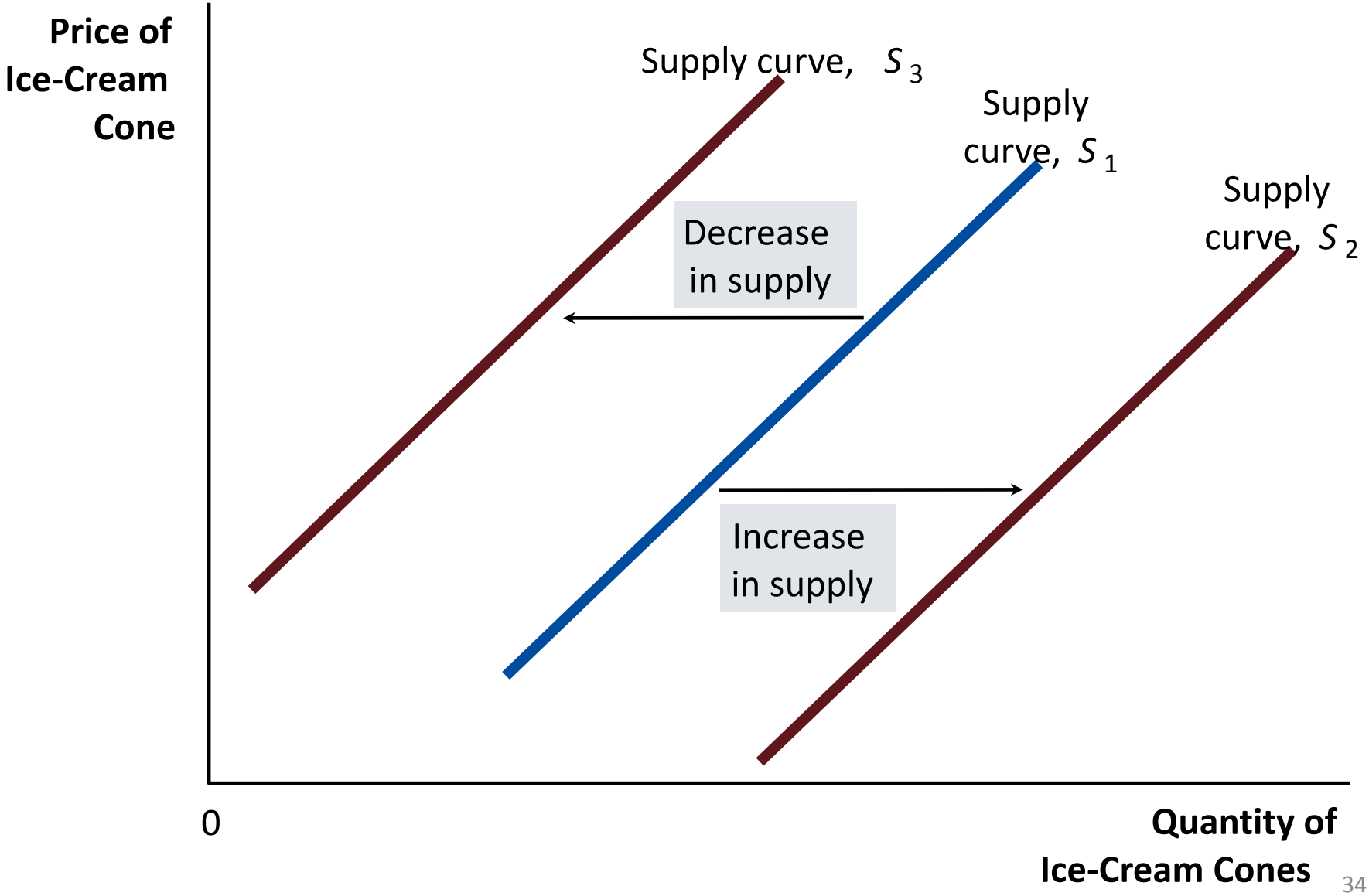
- How can we make sense of the numbers in Ben's supply schedule?
- The best guess is that his costs must be something like the cost schedule below.

A specific ice-cream cone	It's cost ($)
1st	0.75
2nd	1.35
3rd	1.75
4th	2.30
5th	2.85
6th	3.10

Price of Ice-Cream Cone	Quantity of Cones Supplied
$0.00	0 cones
0.50	0
1.00	1
1.50	2
2.00	3
2.50	4
3.00	5

In this way, the Law of Supply follows from the assumption of Increasing Costs (or, Diminishing Returns)

Shifts in the Supply Curve: What causes them?



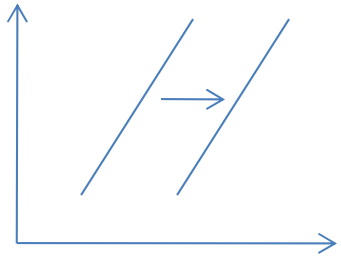
Supply Shift

- How could Ben's supply have increased?

Ice-cream cone	It's cost ($)	
	Before	After
1st	0.75	0.45
2nd	1.35	0.85
3rd	1.75	1.45
4th	2.30	1.95
5th	2.85	2.45
6th	3.10	2.90

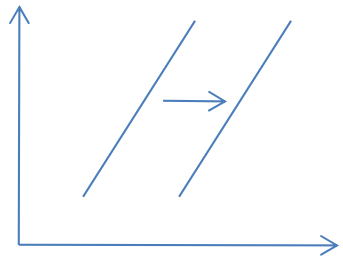
Ben's Supply Schedule		
Price ($)	Quantity Supplied	
	Before	After
0.00	0	0
0.50	0	1
1.00	1	2
1.50	2	3
2.00	3	4
2.50	4	5
3.00	5	6

Anything that reduces production costs, shifts supply to the right.



Shifts in the Supply Curve…

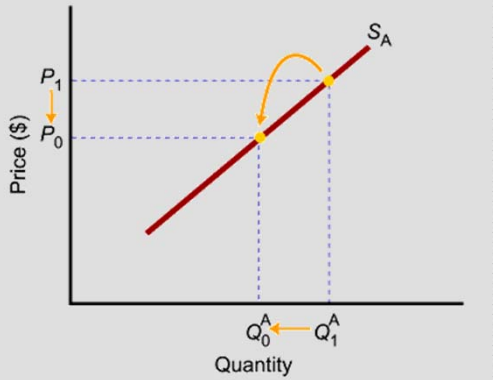
- Supply increases (shifts right) when
  - New technology lowers operating costs.
  - Factor costs decrease.
  - Taxes decrease or subsidies increase.
  - Future prices are expected to rise.
  - Price of alternative goods fall.
  - Number of sellers increases.
- Vice versa, and supply decreases (shifts left).



A Change in Supply Versus a Change in Quantity Supplied

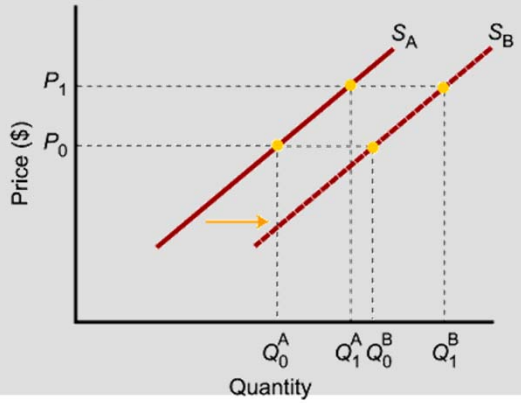
Change in price of a good or service leads to

Change in *quantity supplied* (**Movement along the curve**).



Change in costs, input prices, technology, or prices of related goods and services leads to

Change in supply (**Shift of curve**).



EQUILIBRIUM

Interaction of Demand and Supply

- We have seen what demand and supply are
- We have seen why demand and supply may shift
- Now it is time to say something about how buyers and sellers collectively determine the market outcome
- To do this, we assume **equilibrium**

Equilibrium

- We assume that the price will automatically reach a level at which the quantity demanded equals the quantity supplied
- No shortage exists.
- No surplus exists.
- Qd = Qs = Qe.
- The price will not change until there is a shift in demand or in supply.

Supply and Demand Together

Demand Schedule

Price of Ice-Cream Cone	Market
$0.00	19
0.50	16
1.00	13
1.50	10
2.00	7
2.50	4
3.00	1

Supply Schedule

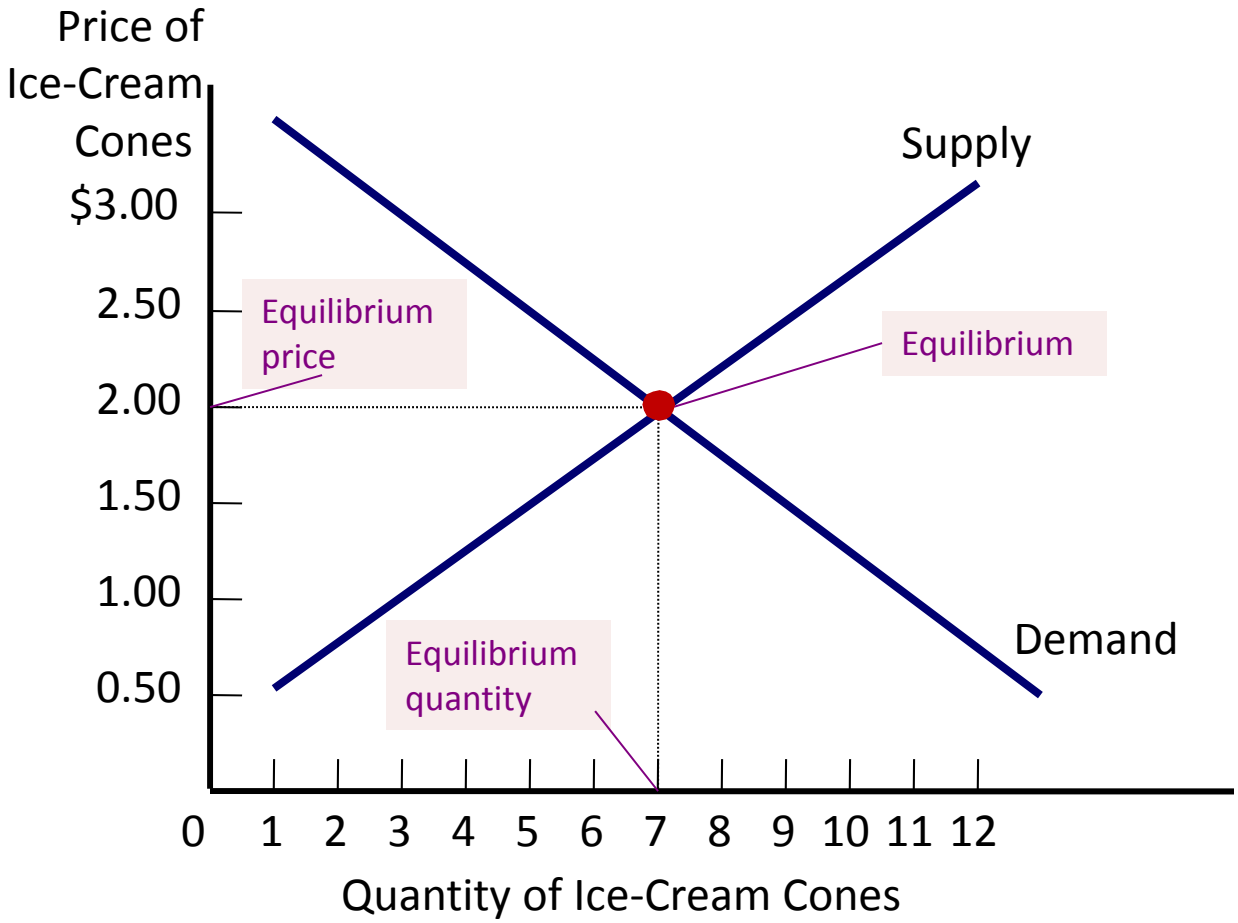
Price of Ice-Cream Cone	Market
$0.00	0
0.50	0
1.00	1
1.50	4
2.00	7
2.50	10
3.00	13

At $2.00, the quantity demanded is equal to the quantity supplied!

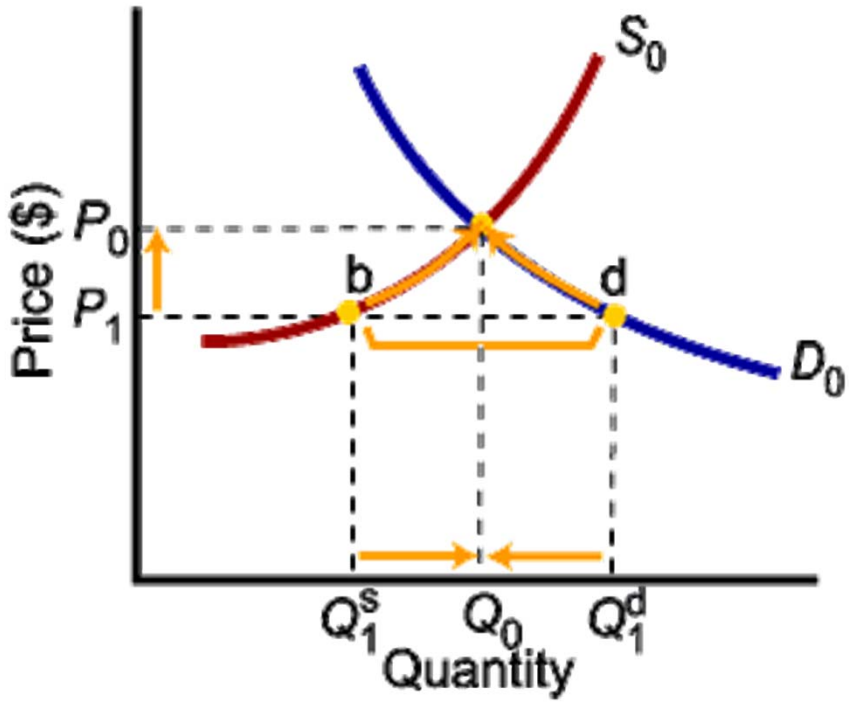
Equilibrium

- Can we justify the assumption of equilibrium?
- Markets reach equilibrium because buyers have a demand behavior (raise price, buy less, and vice versa) and sellers have a supply behavior (raise price, supply more, and vice versa).
  - No one is in charge!
  - The market mechanism (Adam Smith's "invisible hand") leads the market to equilibrium.
- At equilibrium, quantity demanded (Q_d) equals quantity supplied (Q_s) at the equilibrium price (P_e).
  - We say that the market mechanism signals the desired outcome at P_e.

Equilibrium of Supply and Demand

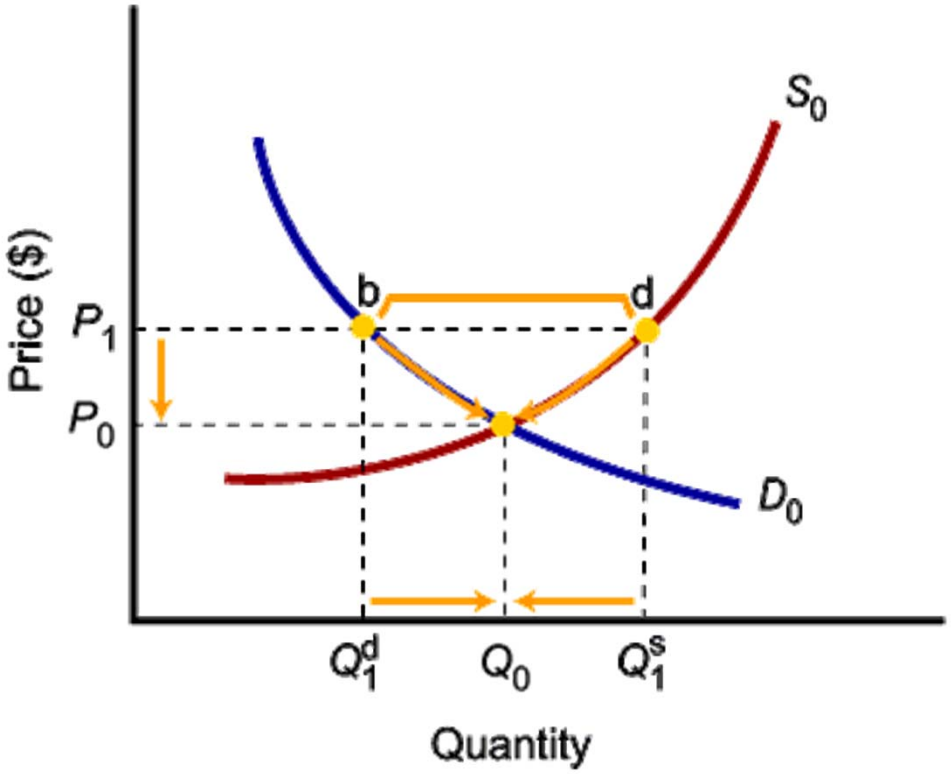


Market Disequilibria



- ***Excess demand***, or shortage, is the condition that exists when quantity demanded exceeds quantity supplied at the current price.
- When quantity demanded exceeds quantity supplied, price tends to rise until equilibrium is restored.

Market Disequilibria

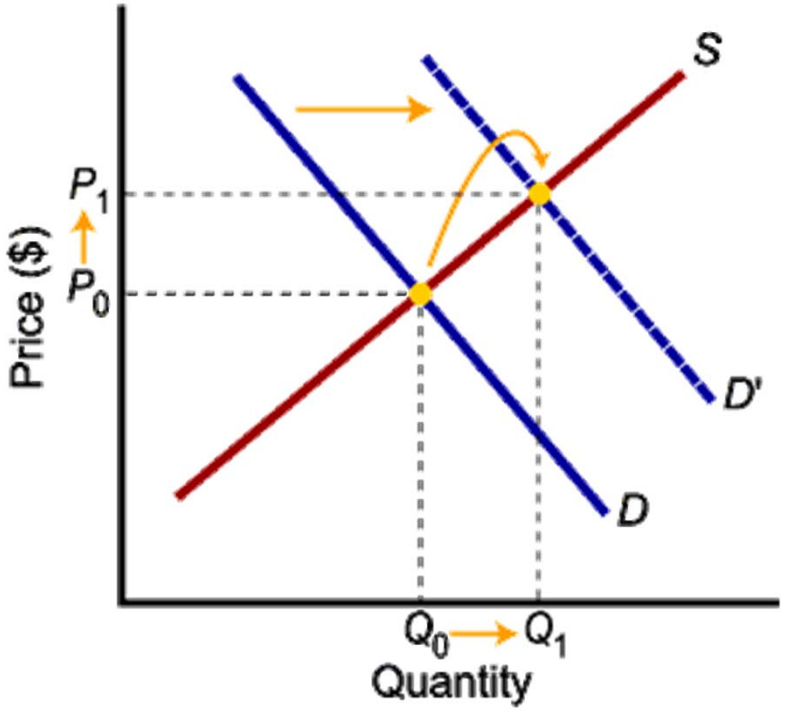


- ***Excess supply***, or surplus, is the condition that exists when quantity supplied exceeds quantity demanded at the current price.
- When quantity supplied exceeds quantity demanded, price tends to fall until equilibrium is restored.

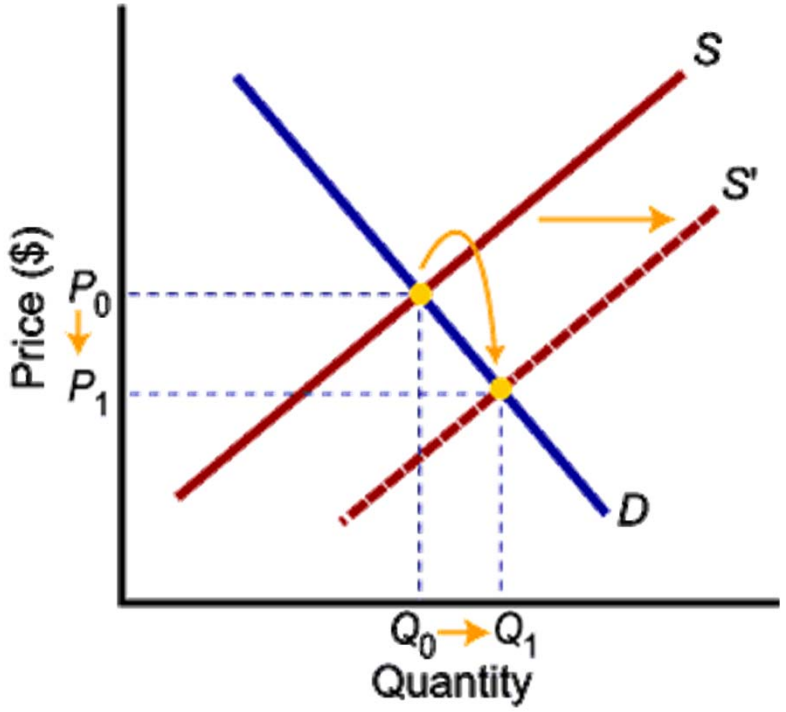
What Causes the Price to Change?

- Price changes when equilibrium is upset.
  - … due to a shift in demand (a change in buyers' behavior), or …
  - … due to a shift in supply (a change in sellers' behavior).
- After the shift, a surplus or a shortage is created, and the market mechanism goes into effect to find the new equilibrium.

Increases in Demand and Supply

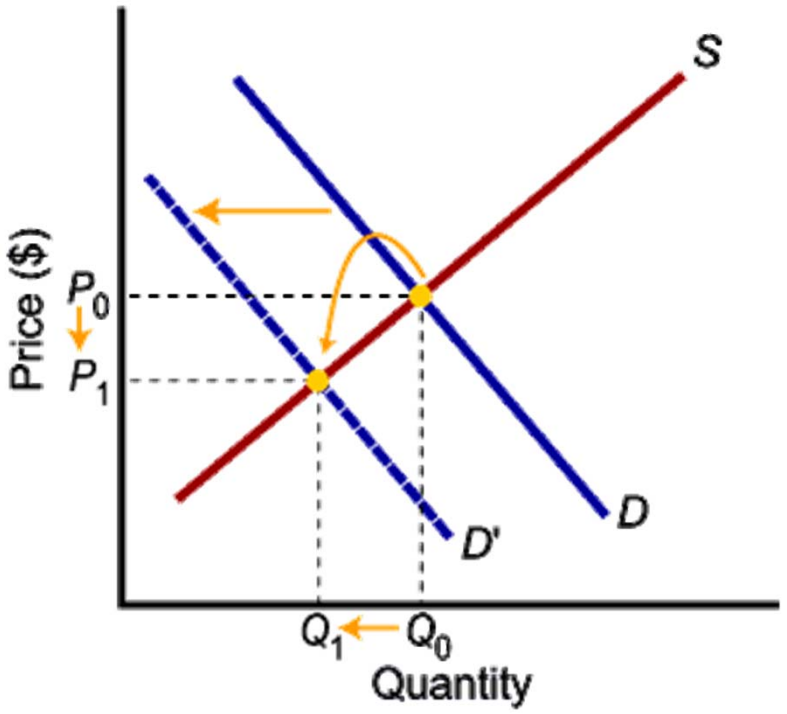


- ***Higher demand*** leads to higher equilibrium price and higher equilibrium quantity.

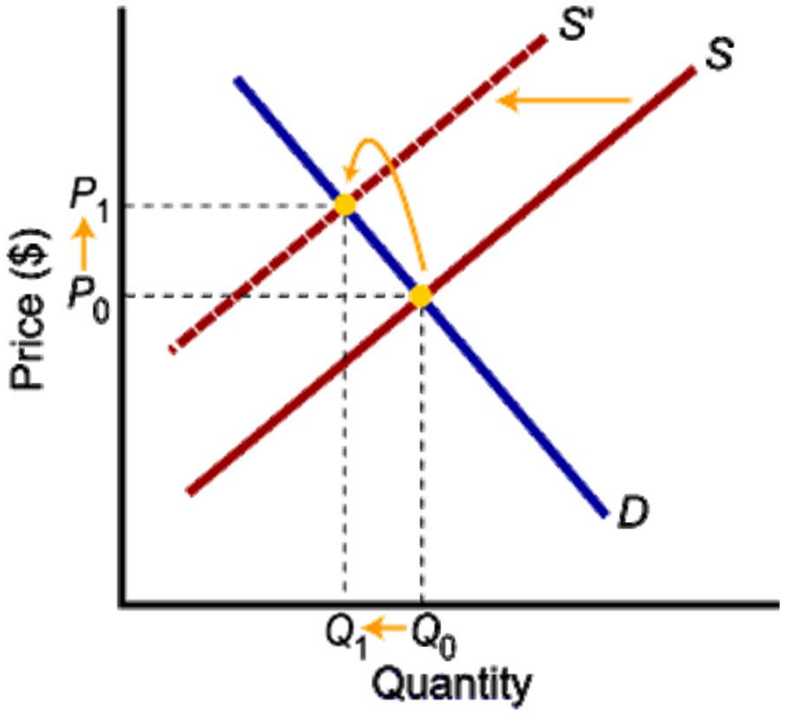


- ***Higher supply*** leads to lower equilibrium price and higher equilibrium quantity.

Decreases in Demand and Supply

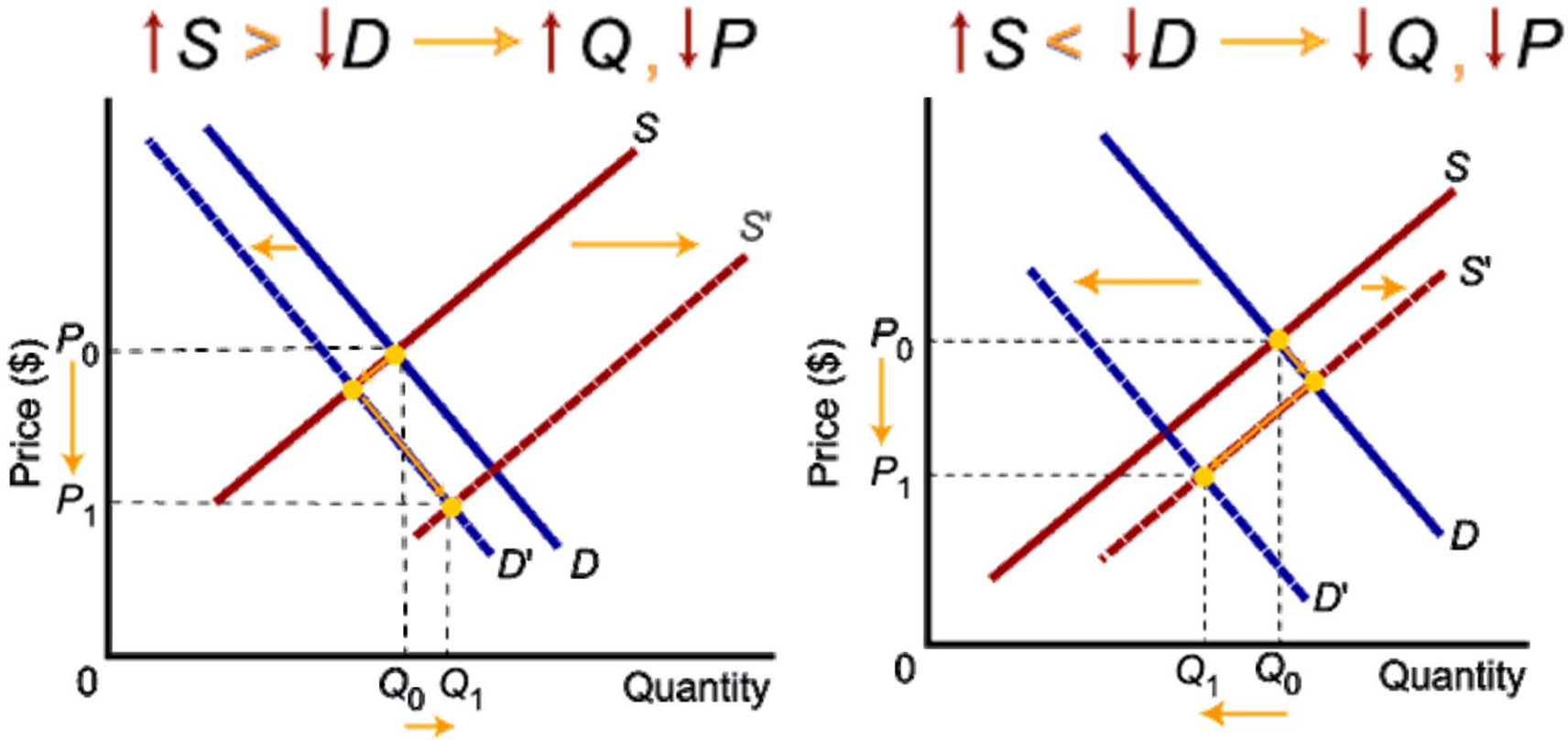


- ***Lower demand*** leads to lower price and lower quantity exchanged.



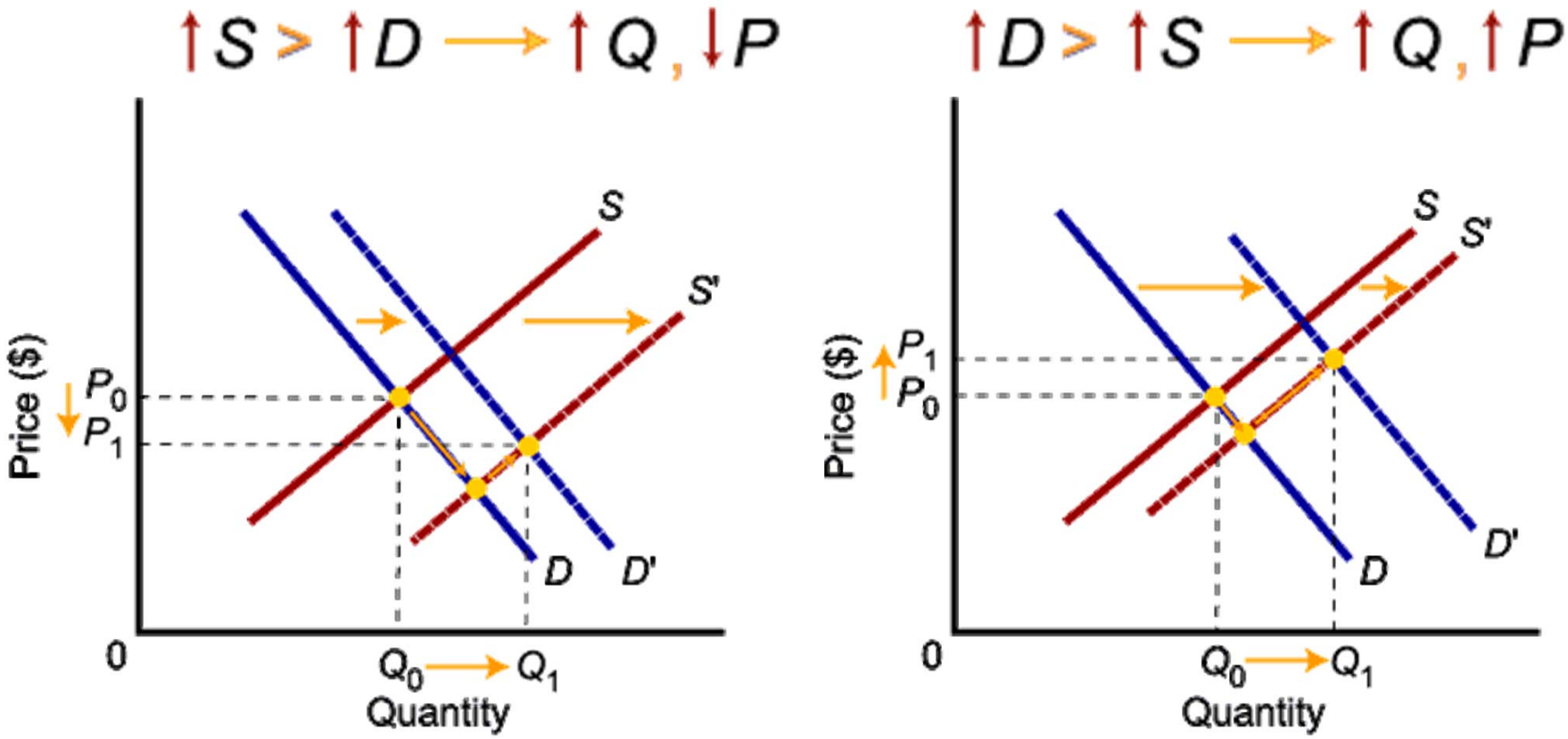
- ***Lower supply*** leads to higher price and lower quantity exchanged.

Relative Magnitudes of Change



- The relative magnitudes of change in supply and demand determine the outcome of market equilibrium.

Relative Magnitudes of Change



- When supply and demand both increase, quantity will increase, but price may go up or down.

Summary: When Do Prices Change?

- Only when a market is in disequilibrium.
  - Shortage? Price rises.
  - Surplus? Price falls.
- A shift in either demand or supply causes the price to change, BUT….
- A price change does NOT cause
  - … the demand curve to shift or
  - … the supply curve to shift.

Market Outcomes

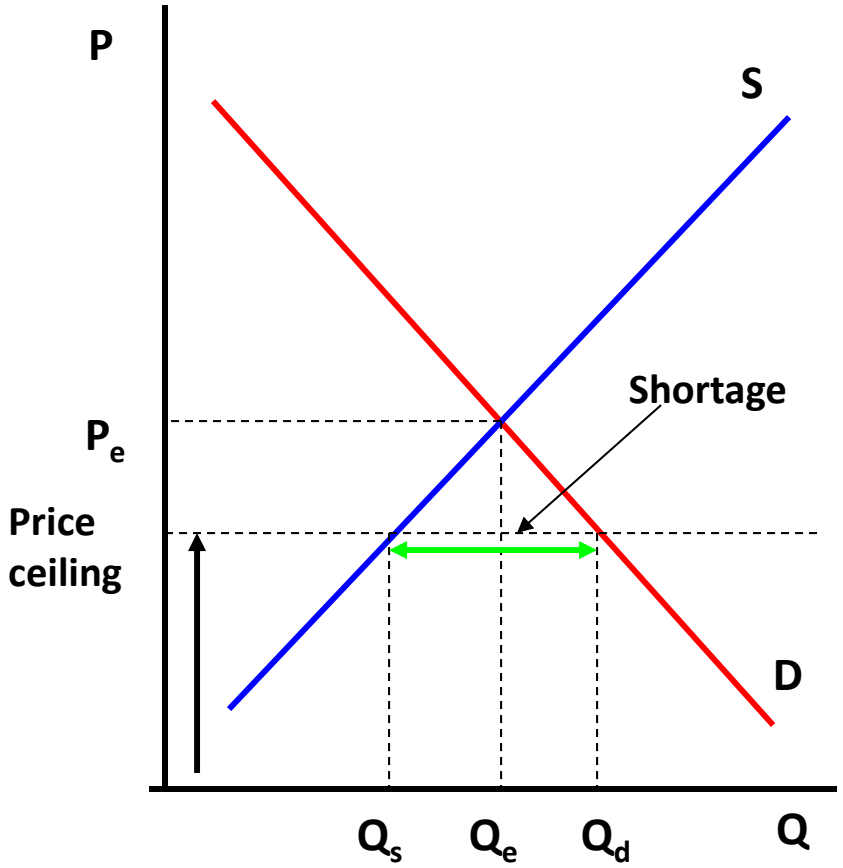
- The market mechanism affects WHAT, HOW, and FOR WHOM to produce.
  - **WHAT?** Markets determine which goods are desired and which are profitable.
  - **HOW?** Profit-seeking producers will strive to produce goods in the most efficient way.
  - **FOR WHOM?** To obtain a good, one must be both willing and able to purchase it.

Price Controls

- Governments may impose an arbitrary maximum price (price ceiling) or a minimum price (price floor) on a market.
  - The result is that the market cannot reach equilibrium.

Price Ceiling

- Government imposes a maximum price less than P_e.
- This generates a shortage ($Q_d > Q_s$).
- The market mechanism cannot clear the market.
- A permanent shortage exists.



Price Floor

- Government imposes a minimum price greater than P_e.
- This generates a surplus ($Q_s > Q_d$).
- The market mechanism cannot clear the market.
- A permanent surplus exists.