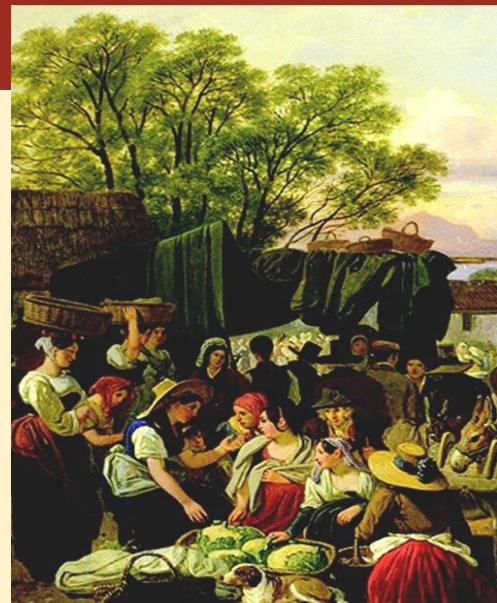


CENGAGE

Learning

Principles of **ECONOMICS**

6th Edition



PART I Introduction



PART II How Markets
Work



PART III Markets and
Welfare



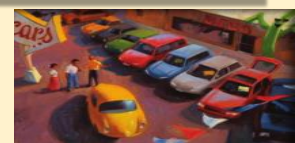
PART IV The Economics
of the Public
Sector



PART V Firm Behavior and
the Organization
of Industry



PART VI The Economics
of Labor Markets

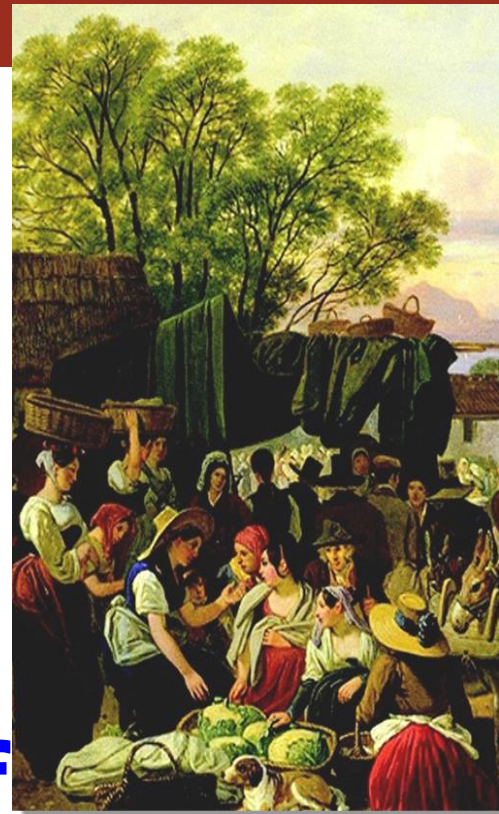


PART VII Topics for Further
Study

N. Gregory Mankiw

CHAPTER - 4

Principles of
MICROECONOMICS
(HSS – 1021)



The Market Forces of Supply and Demand

N. Gregory Mankiw

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In this chapter, look for the answers to these questions:

- What is demand and what factors affect buyers' demand for goods?
- What is supply and what factors affect sellers' supply of goods?
- How do supply and demand determine the price of a good and the quantity sold?
- How do changes in the factors that affect demand or supply affect the market price and quantity of a good?
- How do markets allocate resources?

Markets and Competition

- A **market**
 - is a system or an arrangement where buyers and sellers interact with each other, settle price and transaction took place in this price.
 - is a group of buyers and sellers of a particular product.
- A **competitive market** is one with many buyers and sellers, each has a negligible effect on price.
- A **perfectly competitive** market:
 - all goods exactly the same
 - buyers & sellers so numerous that no one can affect market price – each is a “**price taker**”
- In this chapter, we assume markets are perfectly competitive.

Demand

- Demand comes from the behavior of buyers.
- **Demand** is defined as the desire for a commodity backed by ability and willingness to pay

If you demand something, then you:

- Want it,
 - Can afford it, and
 - Have made a definite plan to buy it.
- Wants are the unlimited desires or wishes people have for goods and services. Demand reflects a decision about which wants to satisfy.

Demand

- **Demand** can also be defined as the amount of a commodity that a consumer is willing and able to purchase at a particular price, particular place and particular time.

Demand has a reference to a :

- price,
- place, and
- time.

Law of Demand

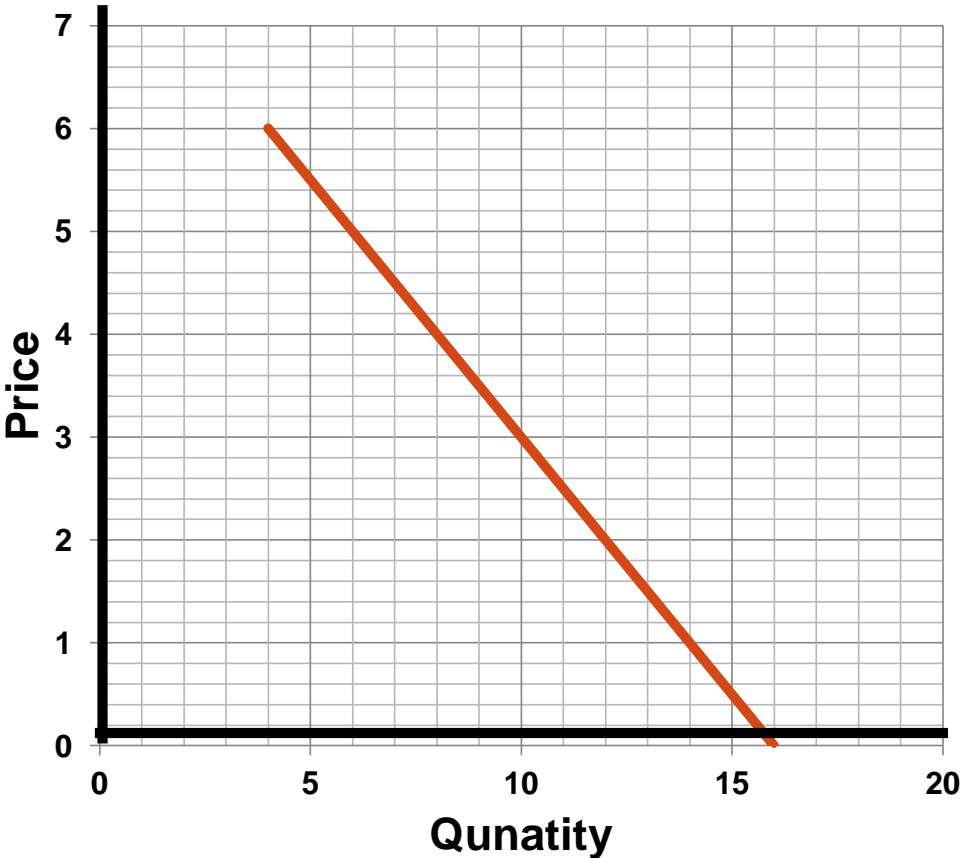
- **Law of demand:** **Ceteris paribus** (*Other things remaining the same*), the higher the price of a good, the smaller is the quantity demanded and vice-versa.
- Law of demand can be explained through demand schedule, demand curve and demand equation.

The Demand Schedule

- **Demand schedule:**
A table that shows the relationship between the price of a good and the quantity demanded.
- Example:
Helen's demand for chocolates.
- Notice that Helen's preferences obey the Law of Demand.

Price of Chocolates	Quantity of Chocolates demanded
0.00	16
1.00	14
2.00	12
3.00	10
4.00	8
5.00	6
6.00	4

Helen's Demand Schedule & Curve



Price of Choc olates	Quantity of Chocolates demanded
0.00	16
1.00	14
2.00	12
3.00	10
4.00	8
5.00	6
6.00	4

The Demand Curve (Equation)

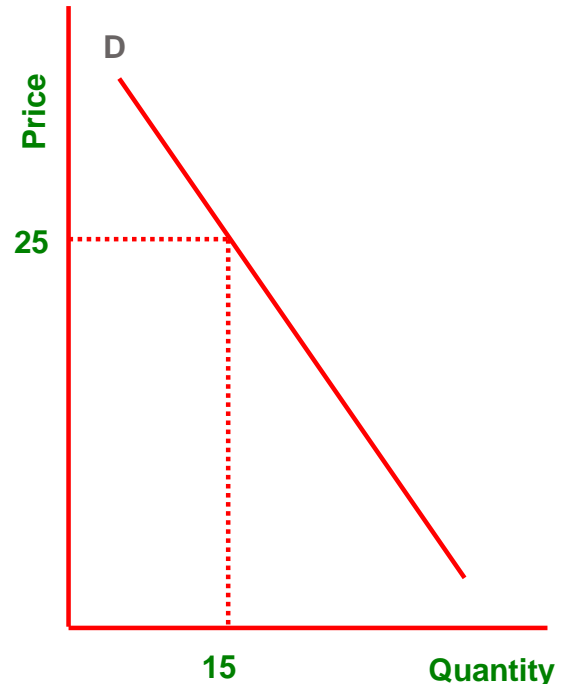
$$X_D = 40 - P$$

- Mathematically, the demand curve is an equation that shows a negative relation between price (P) and quantity (X) for all positive prices and quantities.

A demand curve is a *willingness-and-ability-to-pay* curve.

The smaller the quantity available, the higher is the marginal willingness to pay.

Willingness to pay measures *marginal benefit*.



Market Demand versus Individual Demand

- The quantity demanded in the market is the horizontal sum of the quantities demanded by all buyers at each price.
- Suppose Helen and Kelly are the only two buyers in the Chocolate market and their demand functions are given below. (Q^d = quantity demanded)

Helen's demand function $Q^d_H = 16 - 2P$

Kelly's demand function, $Q^d_K = 8 - P$

Market demand function, $Q^d_M = Q^d_H + Q^d_K$
 $= 16 - 2P + 8 - P$
 $= 24 - 3P$

Market Demand versus Individual Demand

- The quantity demanded in the market is the sum of the quantities demanded by all buyers at each price.
- Suppose Helen and Kelly are the only two buyers in the Chocolate market. (Q^d = quantity demanded)

Price	Helen's Q^d		Kelly's Q^d		Market Q^d
0.00	16	+	8	=	24
1.00	14	+	7	=	21
2.00	12	+	6	=	18
3.00	10	+	5	=	15
4.00	8	+	4	=	12
5.00	6	+	3	=	9
6.00	4	+	2	=	6

The Market Demand Curve for Chocolates



<i>P</i>	<i>Q^d</i> (Market)
0.00	24
1.00	21
2.00	18
3.00	15
4.00	12
5.00	9
6.00	6

Worked Example

Buyers in the Ice-cream market demand 200 cups of Ice-cream when price is zero and decrease the purchase of Ice-cream by 2 cups for every one unit increase in price.

- (a) Write down the equation of the demand function in the form $Q = f(P)$.
- (b) Plot the above demand function for $0 < Q < 200$.
- (c) Find the value of Q when $P = 15$ from the graph. Confirm your answer from the equation.
- (d) Write the equation of the demand function in the form, $P = h(Q)$, i.e. write P in terms of Q (inverse demand function).

Worked Example - Solution

- (a) The general format of a demand equation is $Q = a - bP$, where Q =Quantity and P =Price

In this equation,

‘a’ is the X intercept indicating how much quantity demanded will be there when $P=0$, and

‘b’ is the slope of the demand curve indicating how much of additional product a consumer will buy if the price of the commodity decreases by one unit.

Form information given it is observed that $a=200$ and $b= 2$.

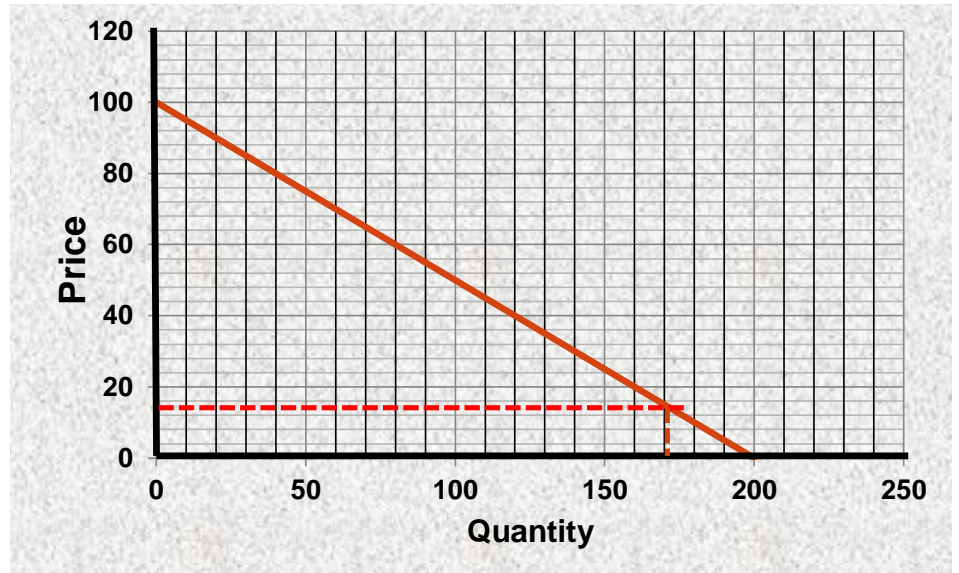
Therefore, the demand equation is $Q= 200 - 2P$

Worked Example - Solution

b) The demand function is $Q = 200 - 2P$.

To plot the demand function over the range, $0 < P < 100$, choose various quantity values within this range as given in following table. Plot these points and graph the demand function

Price	Quantity
0	200
20	160
40	120
60	80
80	40
100	0



Worked Example - Solution

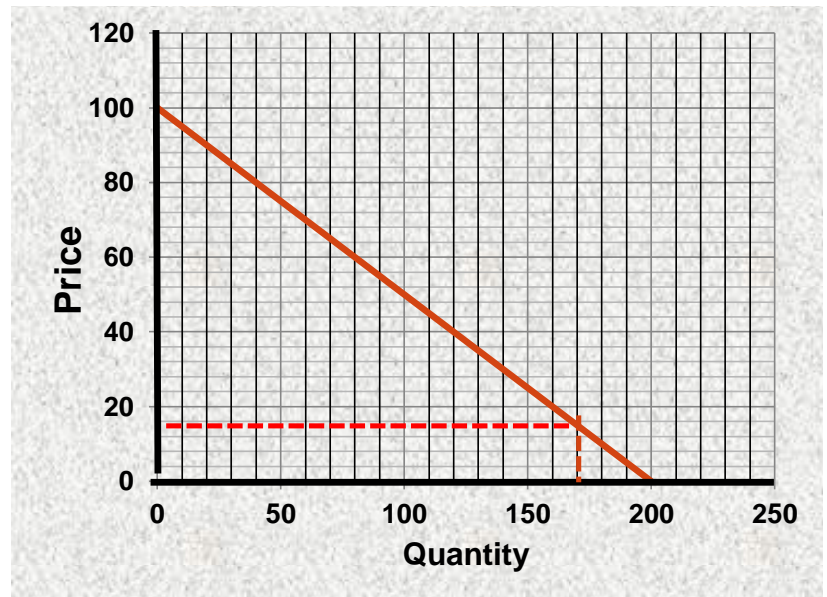
c) The demand function is $Q = 200 - 2P$. When $P = 15$, $Q = 200 - 30 = 170$. This has been shown in the graph.

d) The equation of the demand function in the form $P = h(Q)$ is derived as follows.

$$Q = 200 - 2P$$

$$\Rightarrow 2P = 200 - Q$$

$$\Rightarrow P = 100 - 0.5Q$$



Demand Curve Shifters

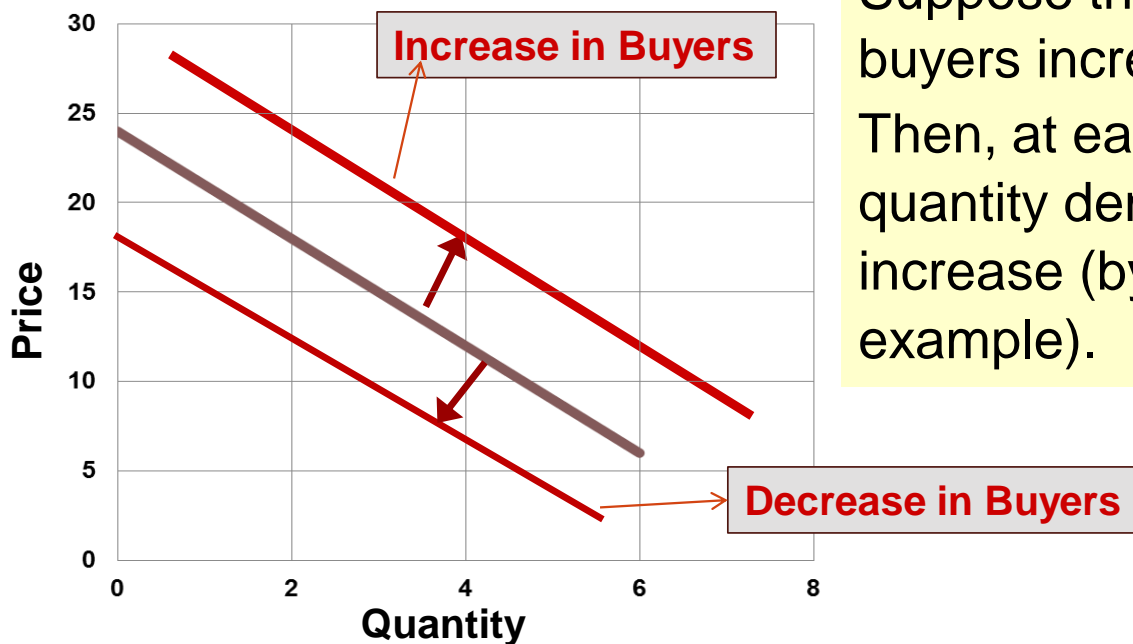
- The demand curve shows how price affects quantity demanded, *other things being equal*.
- These “other things” are non-price determinants of demand (*i.e.*, things that determine buyers’ demand for a good, other than the good’s price) or ‘shift factors’.(responsible for shift of the demand curve either upward to right or downward to left)
- Changes in them shift the **D** curve...

Demand Curve Shifters: Number of buyers

- An increase in the number of buyers causes an increase in quantity demanded at each price, which shifts the demand curve to the right.
- Similarly, a decrease in the number of buyers causes a decrease in quantity demanded at each price, which shifts the demand curve to the left.

Demand Curve Shifters: No. of buyers

An increase in the number of buyers causes an increase in quantity demanded at each price, which shifts the demand curve to the right.

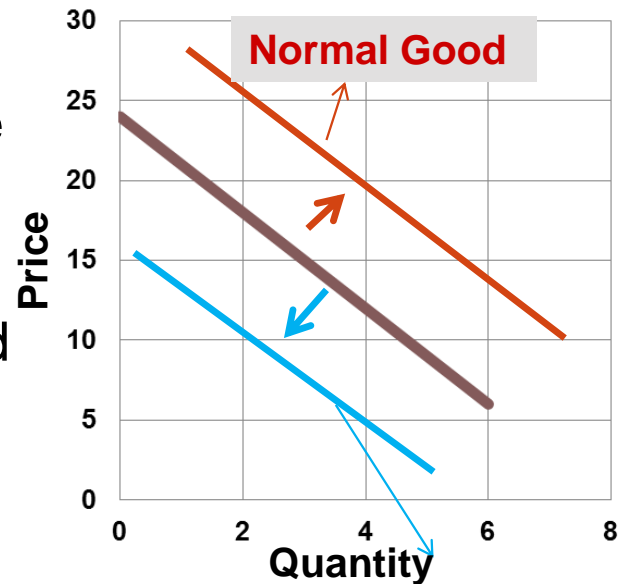


Suppose the number of buyers increases. Then, at each price, quantity demanded will increase (by 2 in this example).

Demand Curve Shifters: income

- Demand for a **normal good** is positively related to income of the consumer.
 - An increase in income causes increase in quantity demanded at each price, shifting the **D** curve to the right.

(Demand for an **inferior good** is negatively related to income. An increase in income shifts **D** curves for inferior goods to the left.)

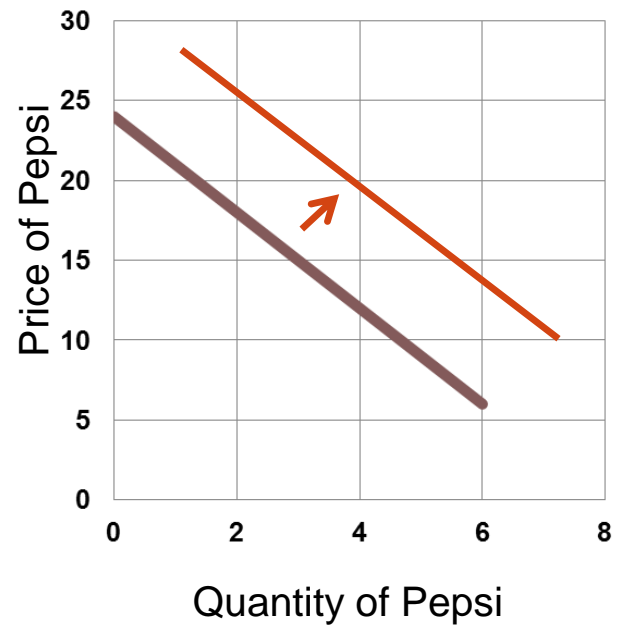


- Related goods can be either **substitutes** or **complements**
- A **substitute good** is one that can be used instead of another good, e.g., trains and buses.
- Two goods are **substitutes** if
 - an increase (decrease) in the quantity demanded of one causes decrease (increase) in the quantity demanded of the other , **OR**
 - an increase (decrease) in the price of one causes an increase (decrease) in demand for the other.

Demand Curve Shifters:

- Example of Substitute Goods : Coke and Pepsi.
- An increased demand of Coke implies a decreased consumption of Pepsi.
- An increase in the price of Coke leads to a decrease demand of Coke and increased demand for Pepsi, shifting Pepsi demand curve to the right.
- Other examples:
 - laptops and desktop computers,
 - compact discs and music downloads

prices of related goods



Shift of Demand curve for Pepsi with an increase in the price of Coke (Price of Pepsi constant)

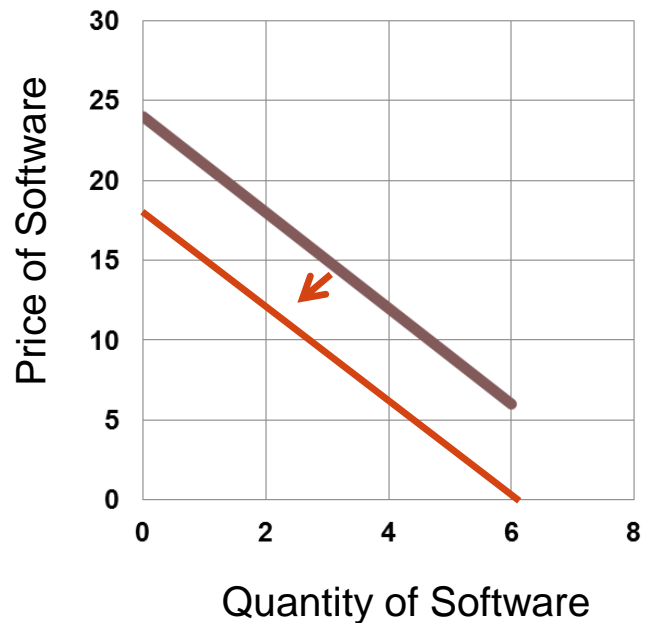
Demand Curve Shifters: prices of related goods

- A **complementary** good is one that is consumed in conjunction with another, e.g. petrol/car.
- Two goods are **complements** if
 - an increase (decrease) in the quantity demanded of one causes increase (decrease) in the quantity demanded of the other , OR
 - an increase (decrease) in the price of one causes a fall (increase) in demand for the other.

Demand Curve Shifters:

prices of related goods

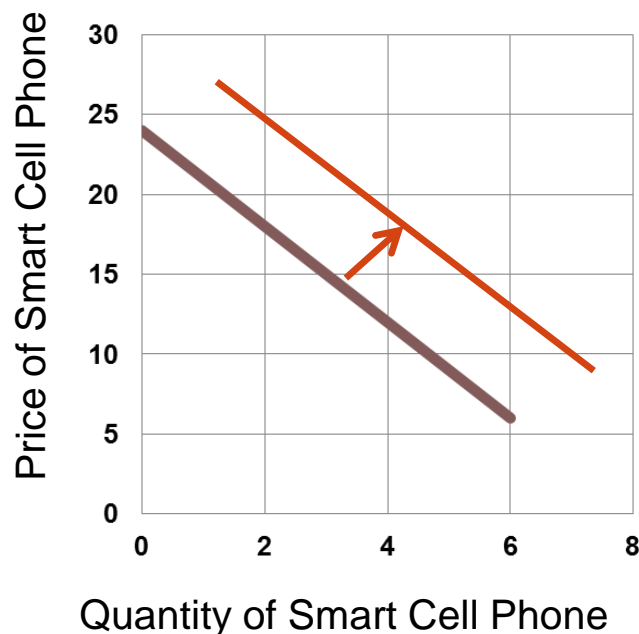
- Example of **Complementary** goods: Computers and Software.
 - If demand for Computer increases, the demand for software also increases because both are demanded jointly.
 - If the price of computers rises, people buy fewer computers, and therefore less software. Therefore software demand curve shifts left.
- Other examples: college tuition and textbooks, pizza and tomato ketchup



Shift of Demand curve for software with an increase in the price of Computer (Price of Software remaining constant)

Demand Curve Shifters: tastes

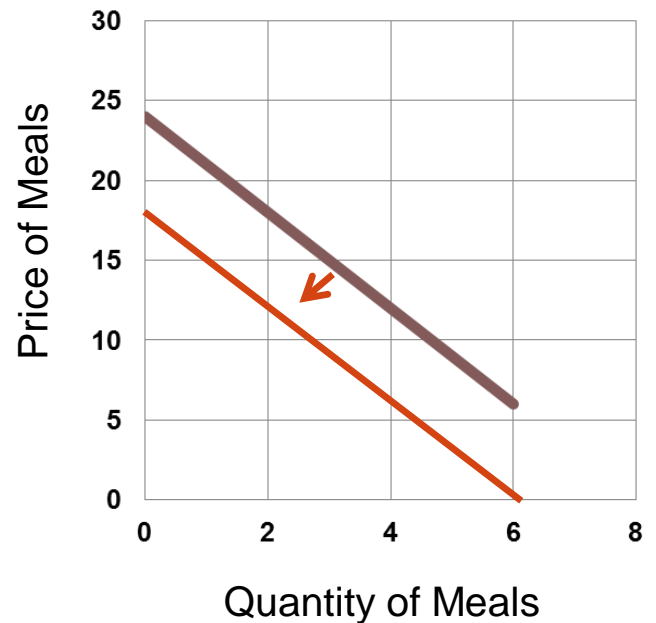
- Anything that causes a shift in tastes *toward* a good will increase demand for that good and shift its **D** curve to the right.
- Example: The smart cell phone became popular in the '90s, caused an increase in demand for smart cell phone, and shifted the smart cell phone demand curve to the right.



Shift of Demand curve for Smart Cell Phone with an increase in taste for the phone (Price of Cell Phone constant)

Demand Curve Shifters: expectations

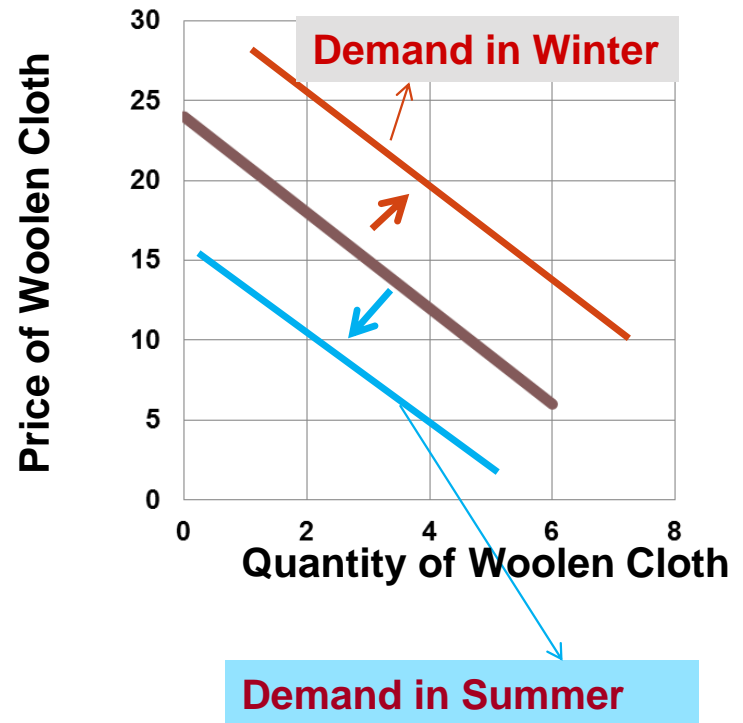
- Expectations affect consumers' buying decisions.
- Examples:
 - If people expect their incomes to rise, their demand for meals at expensive restaurants may increase now.
 - If the economy turns bad and people worry about their future job security, demand for new autos may fall now.



Shift of Demand curve for Meals with an expected increase in income of the consumer (Price of meals constant)

Demand Curve Shifters: climate

- Climatic conditions affect consumers' buying decisions.
- Examples:
 - People demand more woolen clothes in winter and cotton clothes in summer.
 - People demand more ice-cream in summer and less in winter.



Shift of Demand Curve for Woolen Cloth with change in Climate

Summary: Variables That Affect Demand

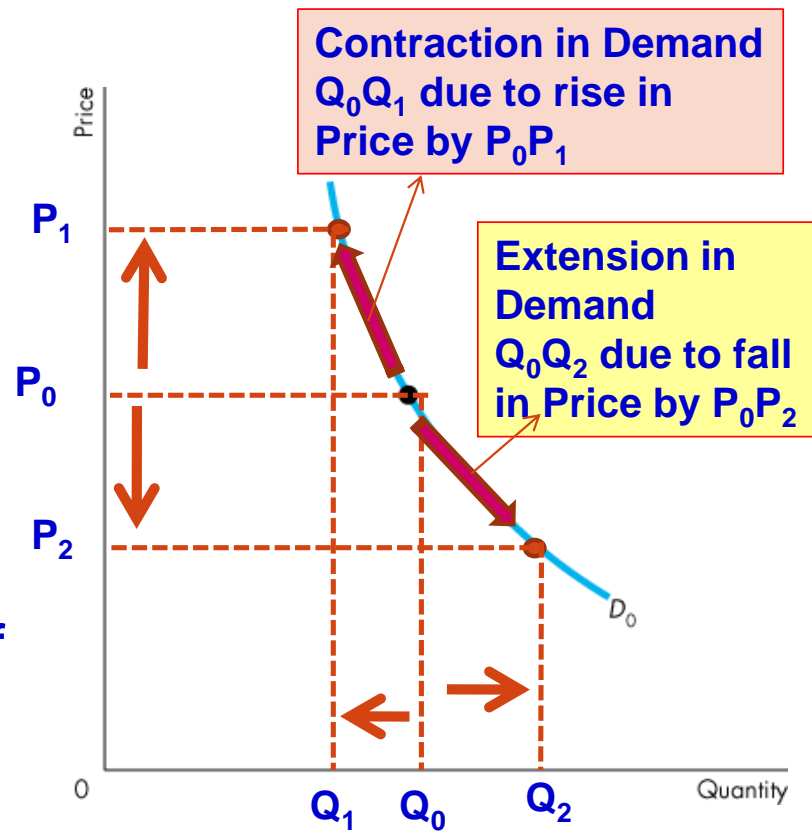
Variable	A change in this variable...
Price	...causes a movement along the D curve
No. of buyers	...shifts the D curve
Income	...shifts the D curve
Price of related goods	...shifts the D curve
Tastes	...shifts the D curve
Expectations	...shifts the D curve
Climate	...shifts the D curve

Summary: Variables That Affect Demand

Variable		Change in Variable	Change in Demand	Demand Curve Shifts to
Income	Normal Good	Increase	Increase	Right
		Decrease	Decrease	Left
	Inferior Good	Increase	Decrease	Left
		Decrease	Increase	Right
Price of Substitutes		Increase	Increase	Right
		Decrease	Decrease	Left
Price of Complementary		Increase	Decrease	Left
		Decrease	Increase	Right
Price Expectation		Increase	Increase	Right
		Fall	Decrease	Left

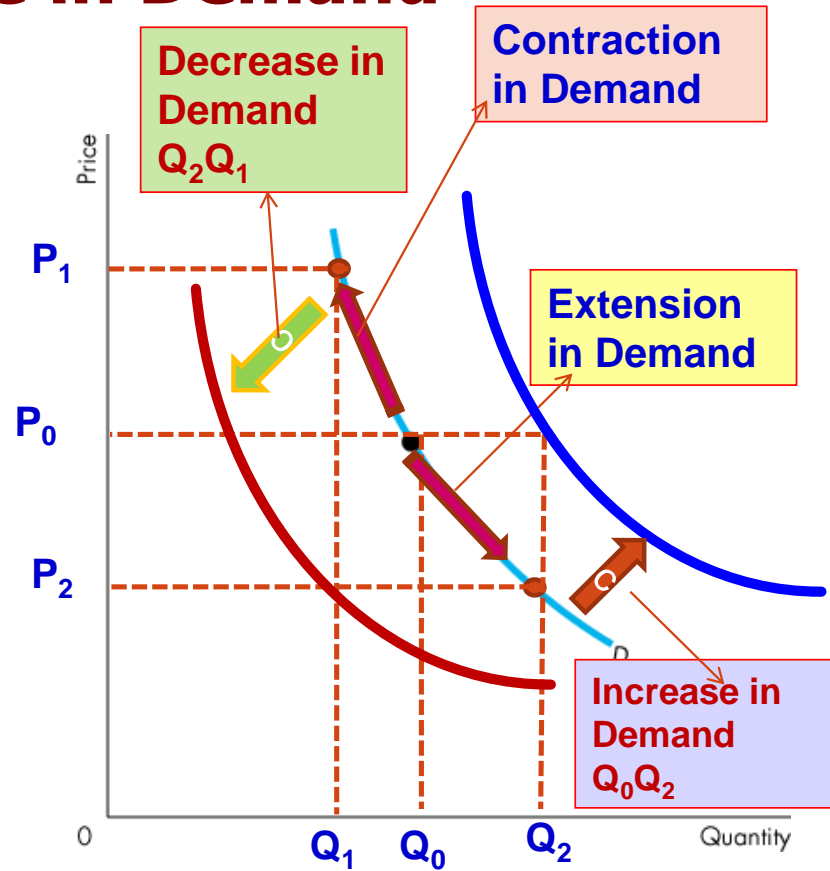
Change in the Quantity Demanded Vs. Change in Demand

- ❖ **Change in quantity demanded** : Change in quantity demanded of a commodity due to a change in the price of the commodity alone other things remaining same
- ❖ **Extension and Contraction of demand**
- ❖ **Movement along the demand curve upward or downward**



Change in the Quantity Demanded Vs. Change in Demand

- ❖ **Change in demand :**
Change in quantity demanded of a commodity due to a change in factors other than the price of the good
- ❖ Increase (Q_0Q_2) and Decrease (Q_0Q_1) in demand
- ❖ Shift in the demand curve upward to the right of downward to the left



ACTIVE LEARNING 1:

Demand curve

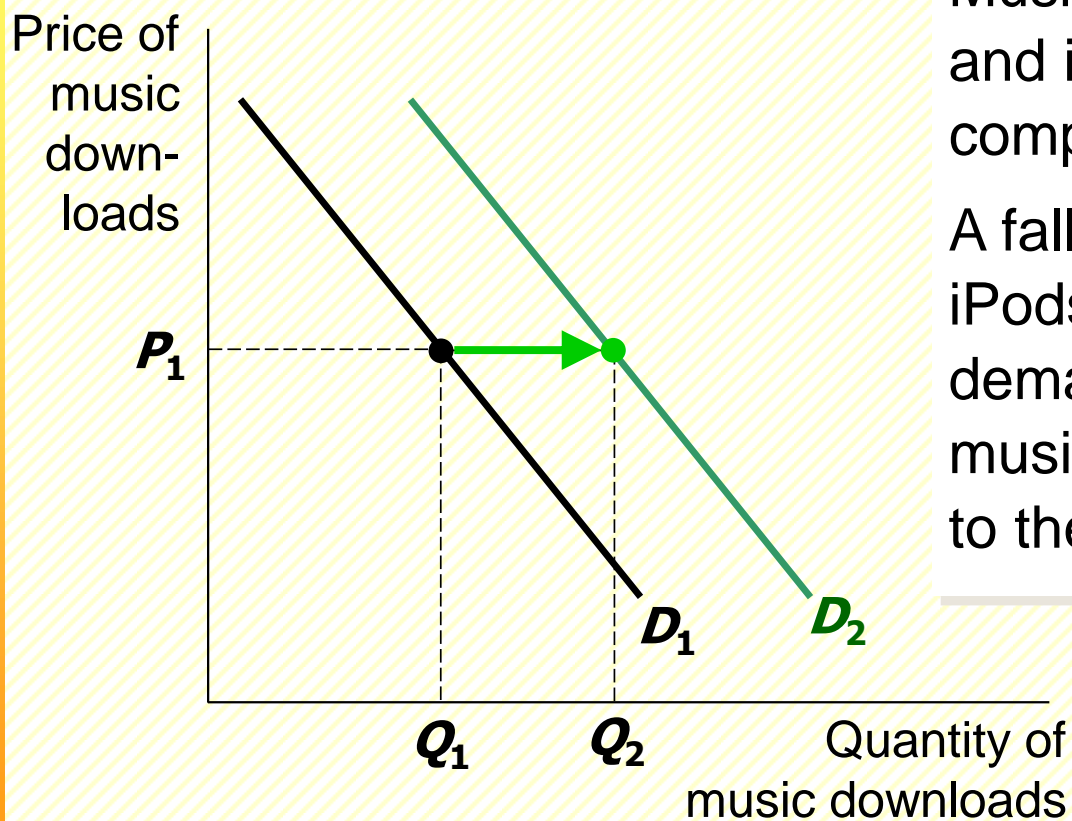
Draw a demand curve for music downloads. What happens to it in each of the following scenarios? Why?

- A.** The price of iPods falls
- B.** The price of music downloads falls
- C.** The price of compact discs falls



ACTIVE LEARNING 1:

A. price of iPods falls

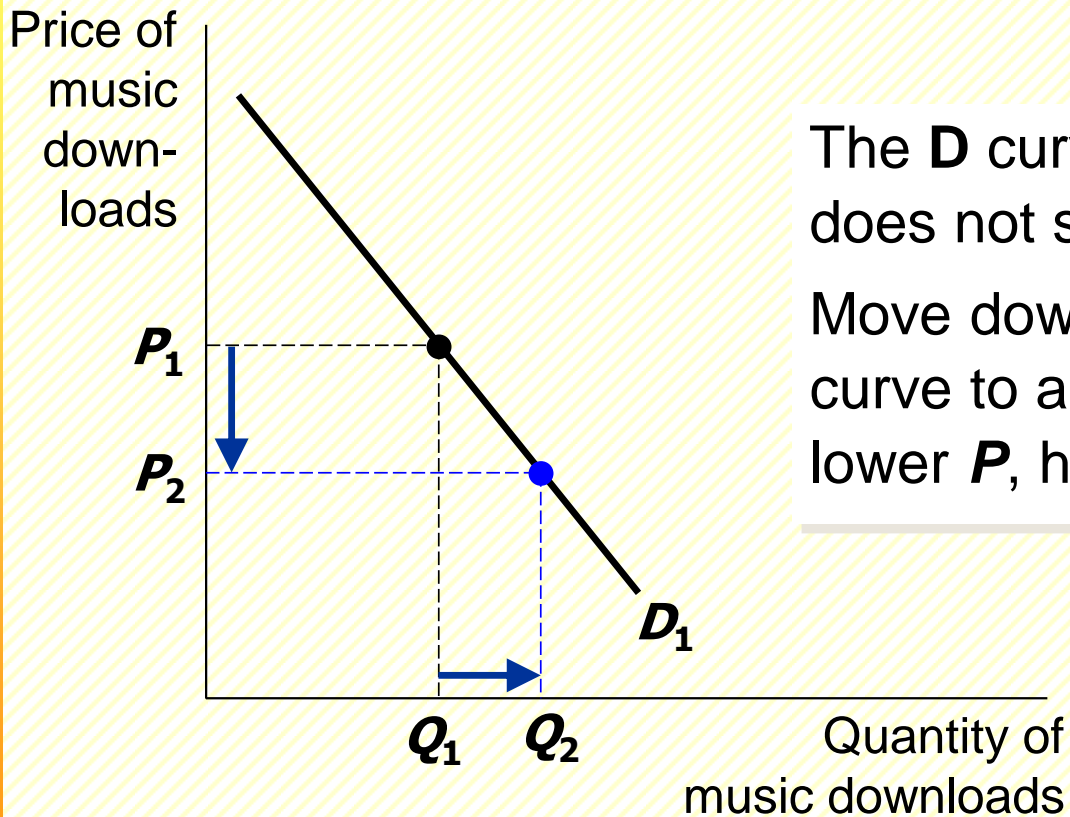


Music downloads and iPods are complements.

A fall in price of iPods shifts the demand curve for music downloads to the right.

ACTIVE LEARNING 1:

B. price of music downloads falls

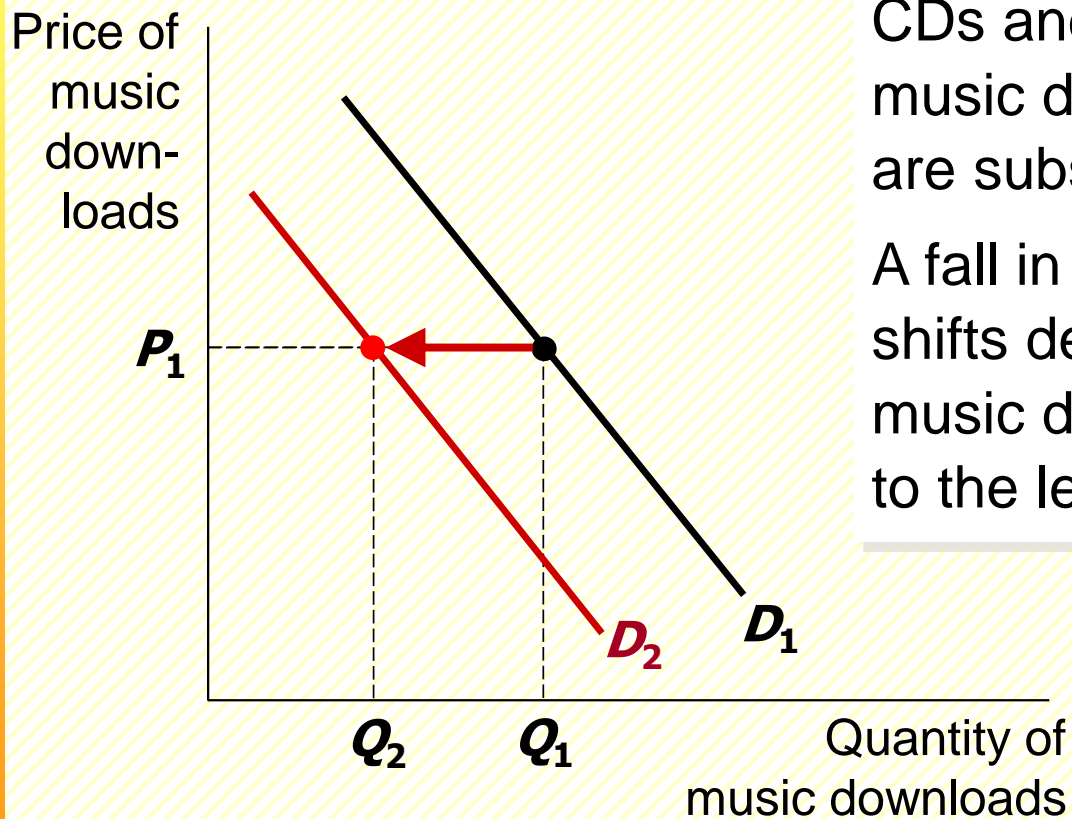


The **D** curve does not shift.

Move down along curve to a point with lower P , higher Q .

ACTIVE LEARNING 1:

C. price of CDs falls



CDs and music downloads are substitutes.

A fall in price of CDs shifts demand for music downloads to the left.

Supply

- Supply comes from the behavior of sellers.
- The **quantity supplied** of any good is the amount of a commodity that sellers are **willing** and **able to sell** at a particular price, particular place and particular time.
- **Law of supply**: the claim that the quantity supplied of a good rises when the price of the good rises and vice versa, other things equal (*ceteris paribus*).

The Supply Schedule

- **Supply schedule:**

A table that shows the relationship between the price of a good and the quantity supplied.

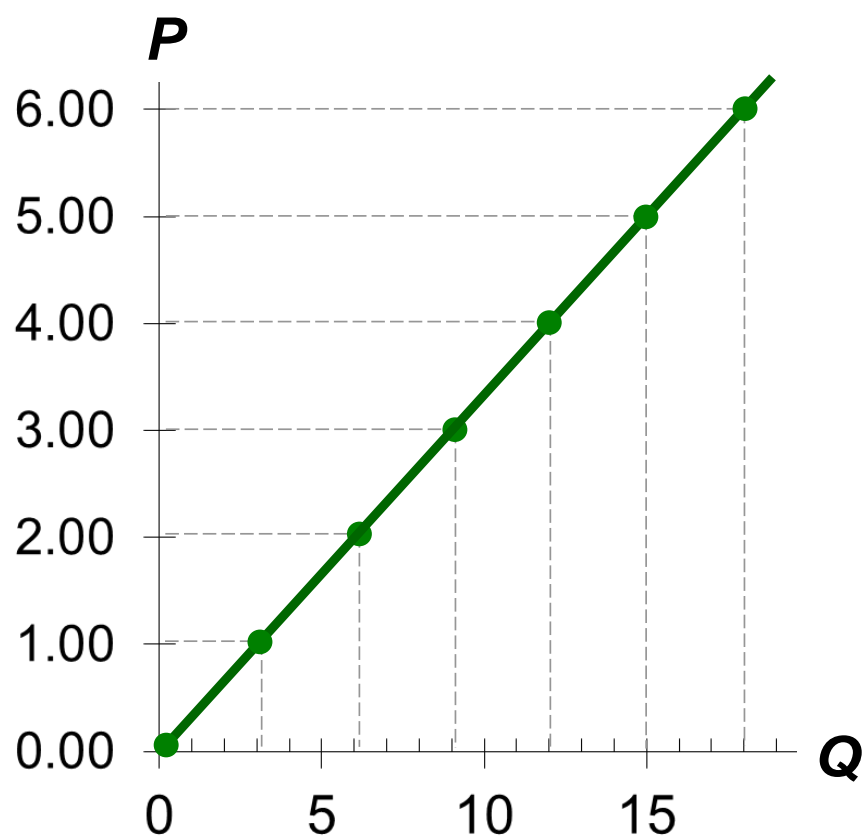
- Example:

Cadbury's supply of chocolates.

- Notice that Cadbury's supply schedule obeys the Law of Supply.

Price of Chocolates	Quantity of Chocolates supplied
0.00	0
1.00	3
2.00	6
3.00	9
4.00	12
5.00	15
6.00	18

Starbucks' Supply Schedule & Curve



	Price of lattes	Quantity of lattes supplied
→	0.00	0
→	1.00	3
→	2.00	6
→	3.00	9
→	4.00	12
→	5.00	15
→	6.00	18

Market Supply versus Individual Supply

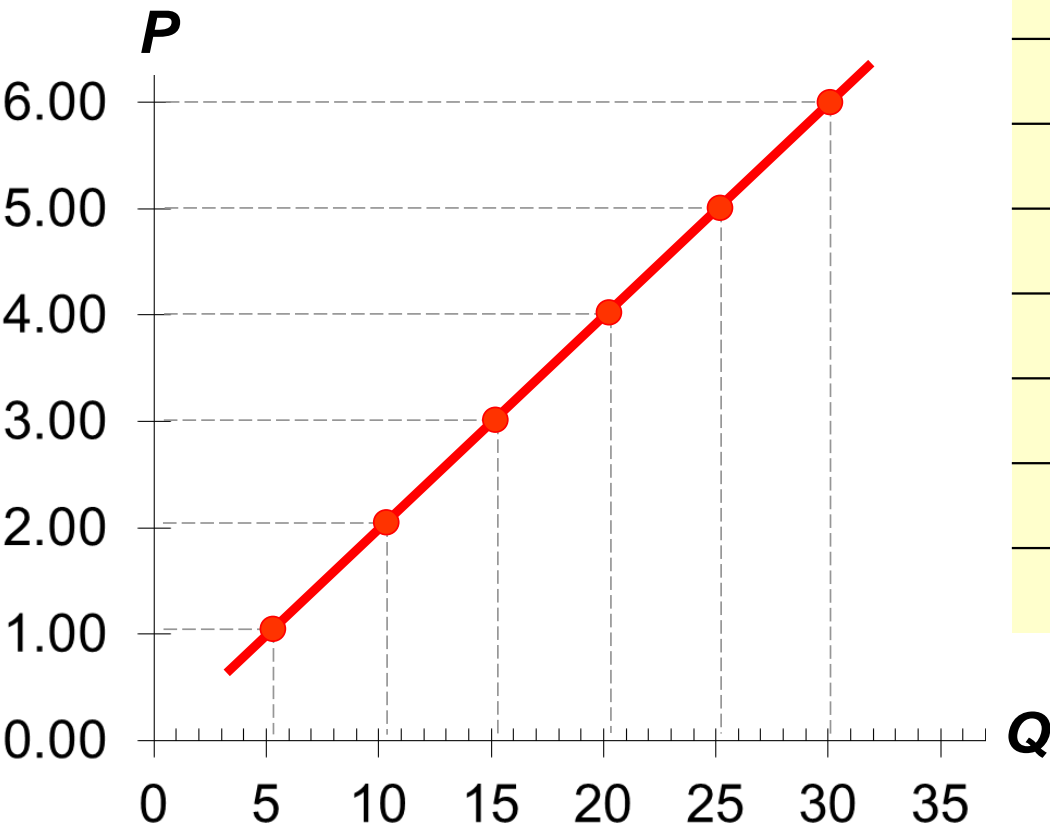
- The quantity supplied in the market is the horizontal sum of the quantities supplied by all sellers at each price.
- Suppose Cadbury and Starbucks are the only two sellers in the Chocolate market and their supply functions are given below. (Q^s = quantity Supplied)
- Supply function of Cadbury, $Q^s_C = 3P$
- Supply function of Starbucks, $Q^s_S = 2P$
- Market Supply function, $Q^s_M = Q^s_C + Q^s_C$
 $= 3P + 2P = 5P$

Market Supply versus Individual Supply

- The quantity supplied in the market is the sum of the quantities supplied by all sellers at each price.
- Suppose Cadbury and Starbucks are the only two sellers in this market. (Q^s = quantity supplied)

Price	Cadbury		Starbucks		Market Q^s
0.00	0	+	0	=	0
1.00	3	+	2	=	5
2.00	6	+	4	=	10
3.00	9	+	6	=	15
4.00	12	+	8	=	20
5.00	15	+	10	=	25
6.00	18	+	12	=	30

The Market Supply Curve



P	Q^s (Market)
0.00	0
1.00	5
2.00	10
3.00	15
4.00	20
5.00	25
6.00	30

Worked Example

A supplier will only start to supply ice-cream cup when a price greater than Rs. 5 per unit is available. He will then increase output by 2 units (2 cups of ice-cream) for every 1 unit (Rs.) increase in price.

- (a) Plot the supply function in the form $Q = f(P)$ for $0 < Q < 20$.
- (b) Write down the equation of the supply function in the form $Q = f(P)$.
- (c) Find the value of Q when $P = 15$ from the graph. Confirm your answer from the equation.
- (d) Write the equation of the supply function in the form, $P = h(Q)$, i.e. write P in terms of Q . Plot the graph of P in terms of Q .

Worked Example - Solution

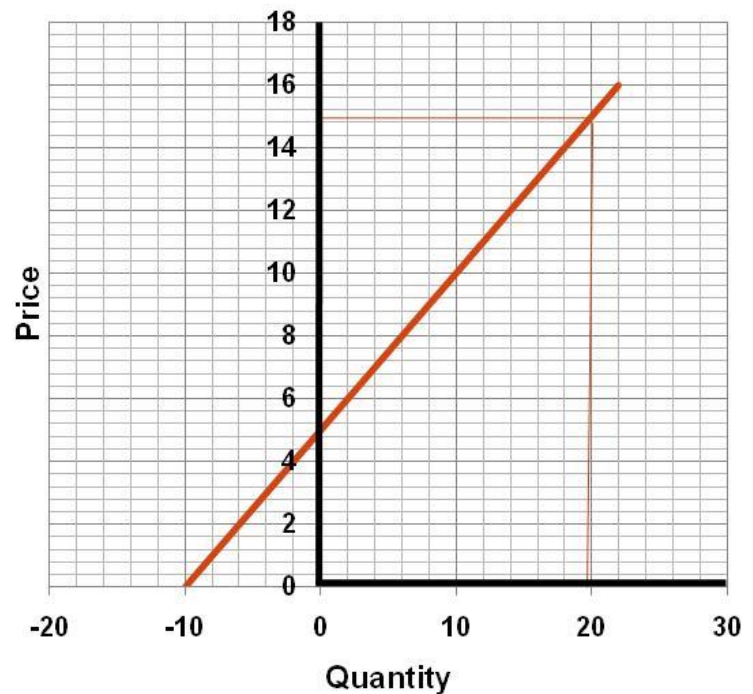
- (a) Since a graph of the form $Q = f(P)$ is required, by convention plot P on the vertical axis and Q on the horizontal one.

In this case the graph crosses the vertical axis at $P = 5$, that is, the supplier will supply no goods (ice-cream cup) at a price less than or equal to Rs. 5 per unit.

Plot the point $P = 5$, and $Q = 0$.

From this point, draw a line with a slope of 2 (change in Q per unit change in P).

This line cuts the vertical axis at $Q = -10$.



Price	5	6	7	8	9	10
Quantity Supplied	0	2	4	6	8	10

Worked Example - Solution

- (b) The general format for the equation of a straight line is $y = mx + c$. *In this case, slope $m = 2$ and vertical intercept, $c = -10$.*

The required equation, therefore, for the supply function is, $Q = -10 + 2P$.

- (c) As observed from the Graph, it is observed that $Q=20$ when $P = 15$.

Putting the value of $P = 15$ in the equation

$$Q = -10 + 2P, \text{ we have } Q = -10 + 30 = 20.$$

- (d) The equation of the supply function in the form $P = h(Q)$ is derived as follows:

$$Q = -10 + 2P$$

$$\Rightarrow -2P = -10 - Q$$

$$\Rightarrow P = 5 + 0.5Q \text{ (dividing across by -2)}$$

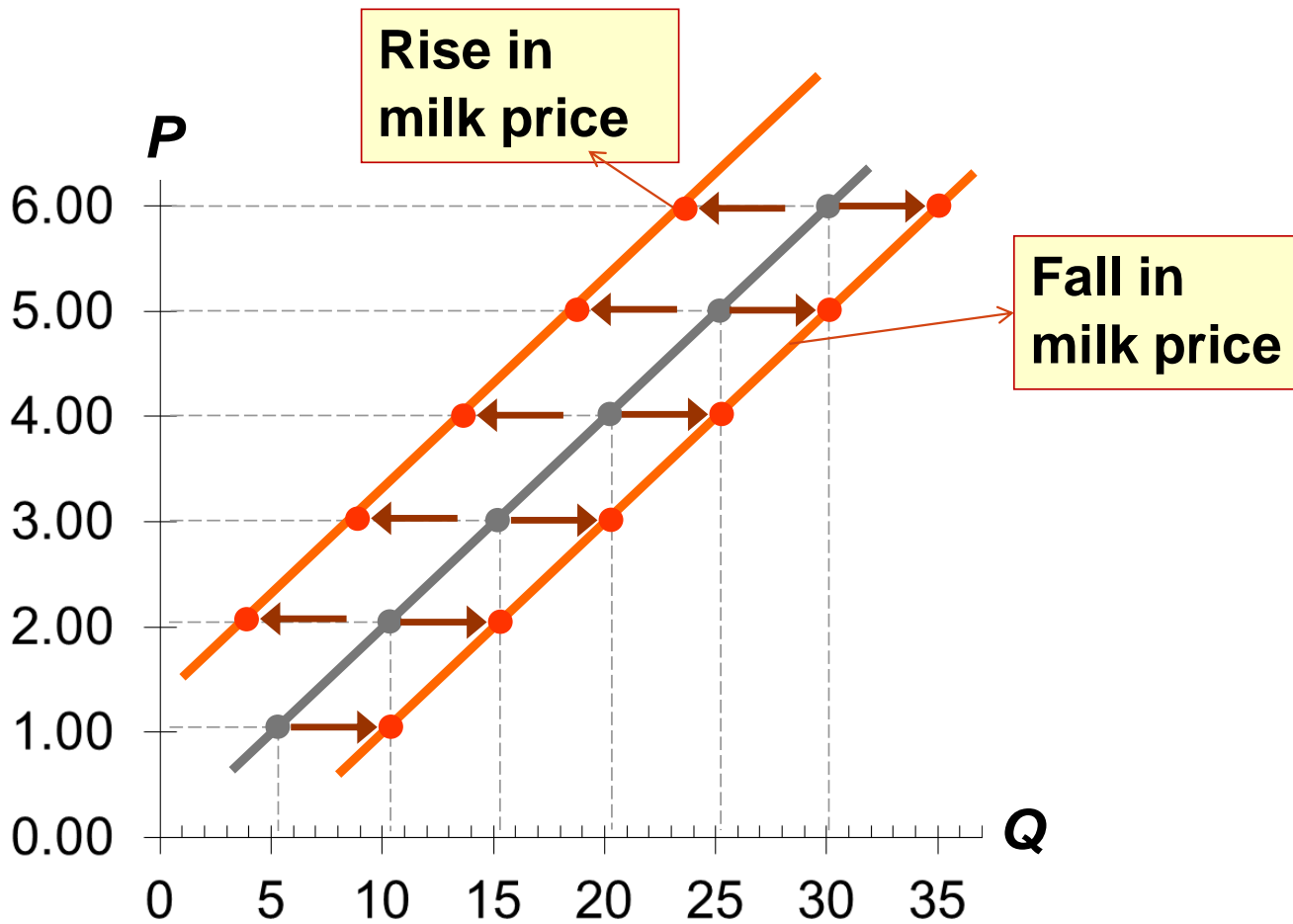
Supply Curve Shifters

- The supply curve shows how price affects quantity supplied, *other things being equal*.
- These “other things” are non-price determinants of supply or the ‘shift factors’.
- Changes in them shift the **S** curve...

Supply Curve Shifters: input prices

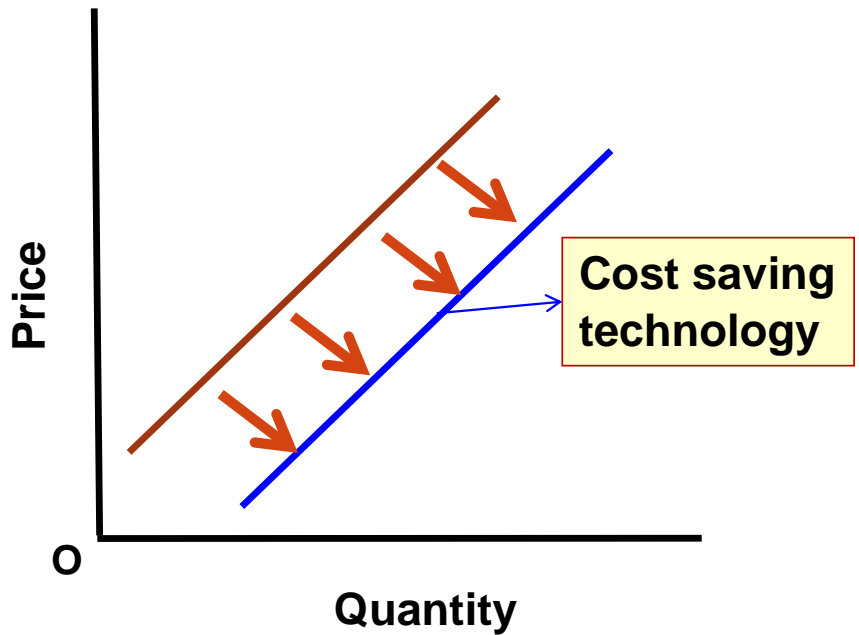
- Examples of input prices:
wages, prices of raw materials etc.
- A fall in input prices makes production more profitable at each output price, so firms supply a larger quantity at each price, and the **S** curve shifts to the right.

Supply Curve Shifters: input prices



Supply Curve Shifters: technology

- Technology determines how much inputs are required to produce a unit of output.
- A cost-saving technological improvement has same effect as a fall in input prices, shifts the **S** curve to the right.



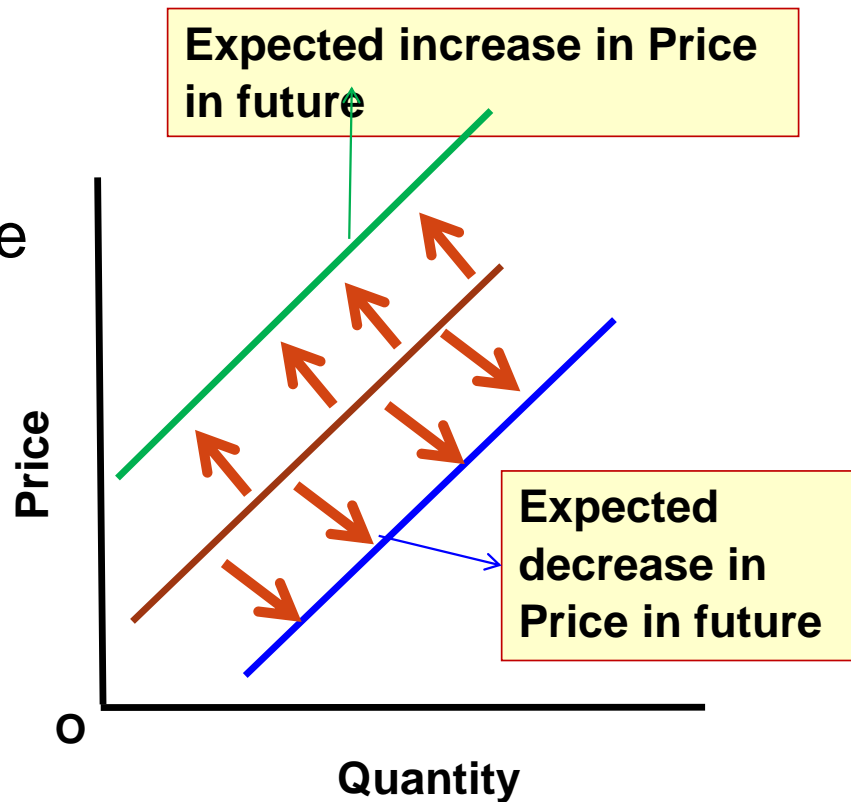
Supply Curve Shifters: No. of sellers

- An increase in the number of sellers increases the quantity supplied at each price, shifts the **S** curve to the right.



Supply Curve Shifters: expectations

- Suppose a firm expects the price of the good it sells to rise in the future.
- The firm may reduce supply now, to save some of its inventory to sell later at the higher price.
- This would shift the **S** curve leftward.



Summary: Variables That Affect Supply

Variable	A change in this variable...
Price	...causes a movement along the S curve
Input prices	...shifts the S curve
Technology	...shifts the S curve
No. of sellers	...shifts the S curve
Expectations	...shifts the S curve

Summary: Variables That Affect Supply

Variable	Change in Variable	Change in Supply	Supply Curve Shifts to
Input Price	Increase	Decrease	Left
	Decrease	Increase	Right
Level of Technology	Increase	Increase	Right
	Decrease	Decrease	Left
Price Expectation	Increase	Increase	Right
	Decrease	Decrease	Left
Number of Sellers	Increase	Increase	Right
	Decrease	Decrease	Left

Terms for Shift vs. Movement Along Curve

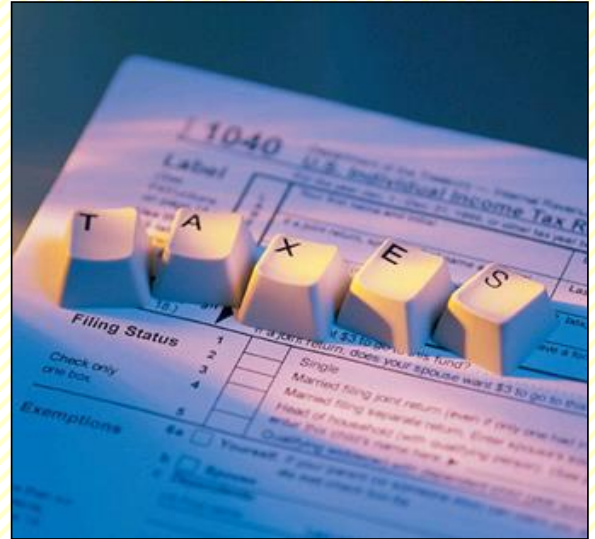
- **Change in supply:** a shift in the **S** curve
 - occurs when a non-price determinant of supply changes (like technology or costs)
- **Change in the quantity supplied:**
a movement along a fixed **S** curve
 - occurs when **P** changes
- **Change in demand:** a shift in the **D** curve
 - occurs when a non-price determinant of demand changes (like income or number of buyers)
- **Change in the quantity demanded:**
a movement along a fixed **D** curve
 - occurs when **P** changes

ACTIVE LEARNING 2:

Supply curve

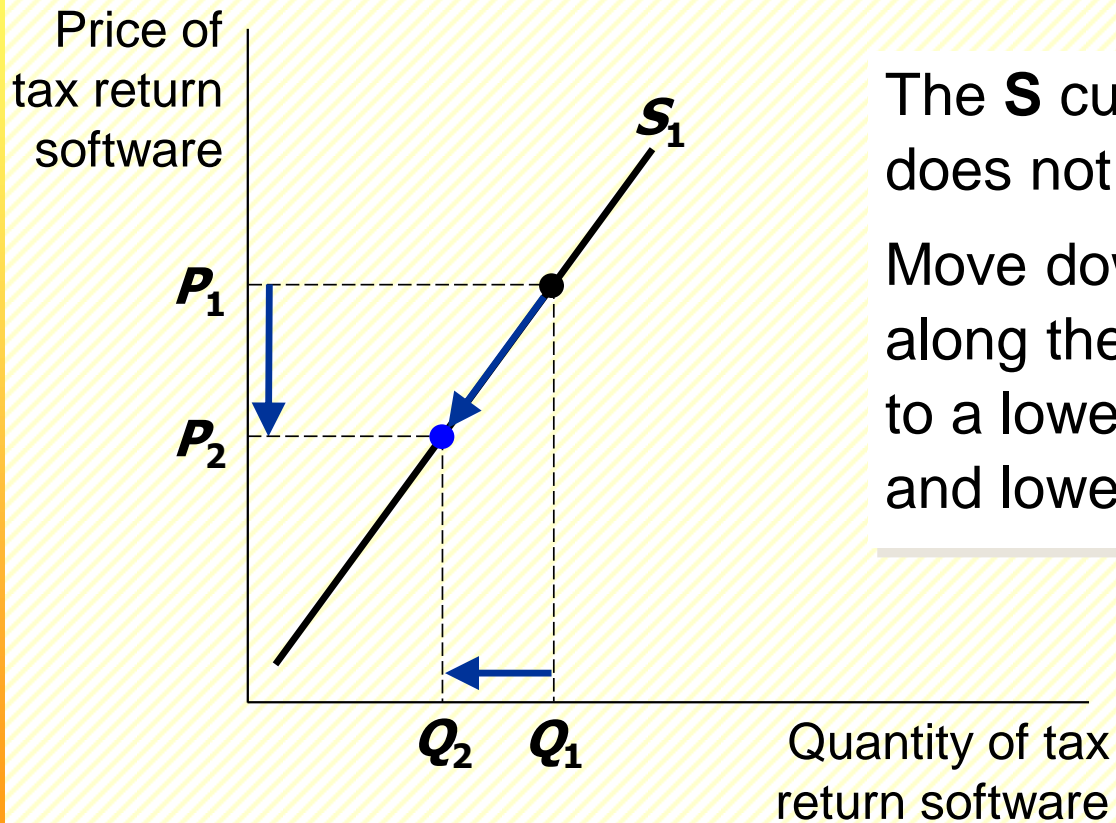
Draw a supply curve for tax return preparation software. What happens to it in each of the following scenarios?

- A.** Retailers cut the price of the software.
- B.** A technological advance allows the software to be produced at lower cost.
- C.** Professional tax return preparers raise the price of the services they provide.



ACTIVE LEARNING 2:

A. fall in price of tax return software

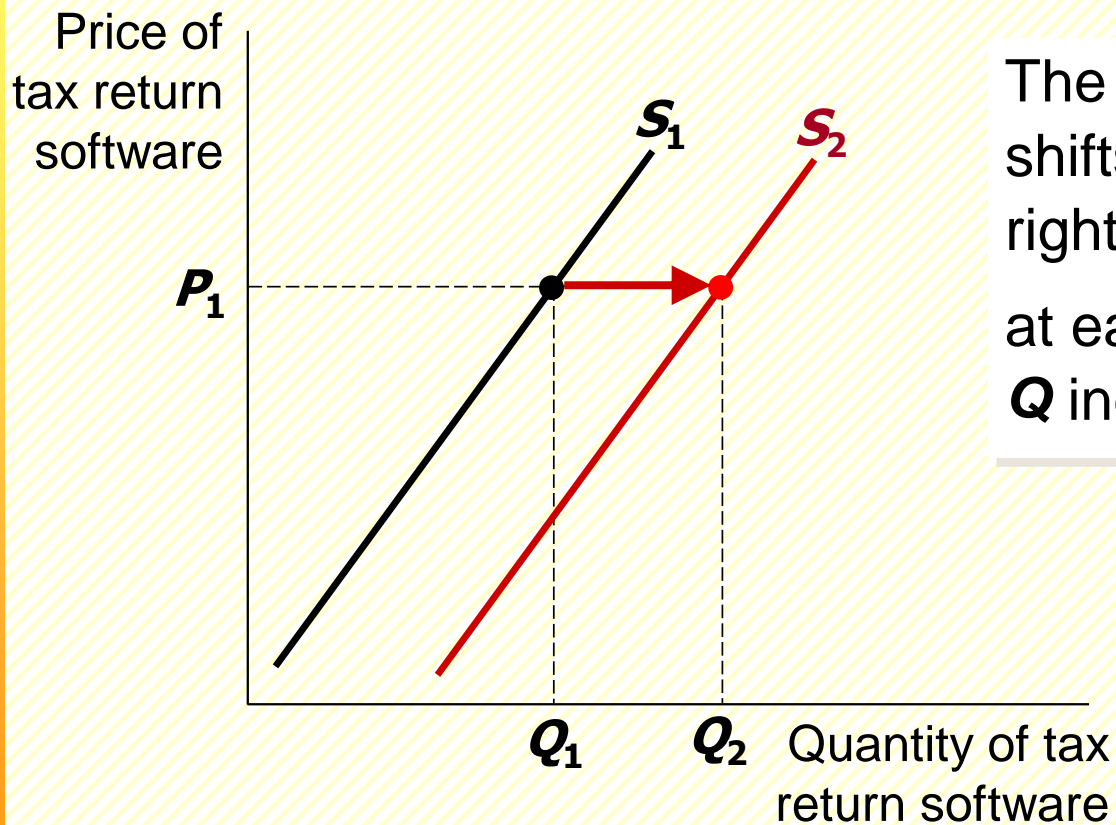


The **S** curve does not shift.

Move down along the curve to a lower **P** and lower **Q**.

ACTIVE LEARNING 2:

B. fall in cost of producing the software

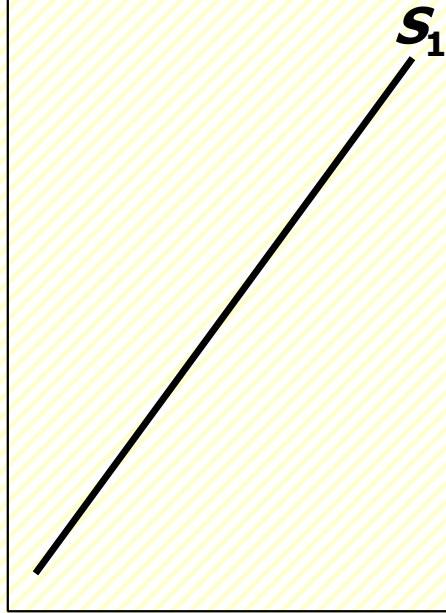


The **S** curve shifts to the right:
at each price, **Q** increases.

ACTIVE LEARNING 2:

C. professional preparers raise their price

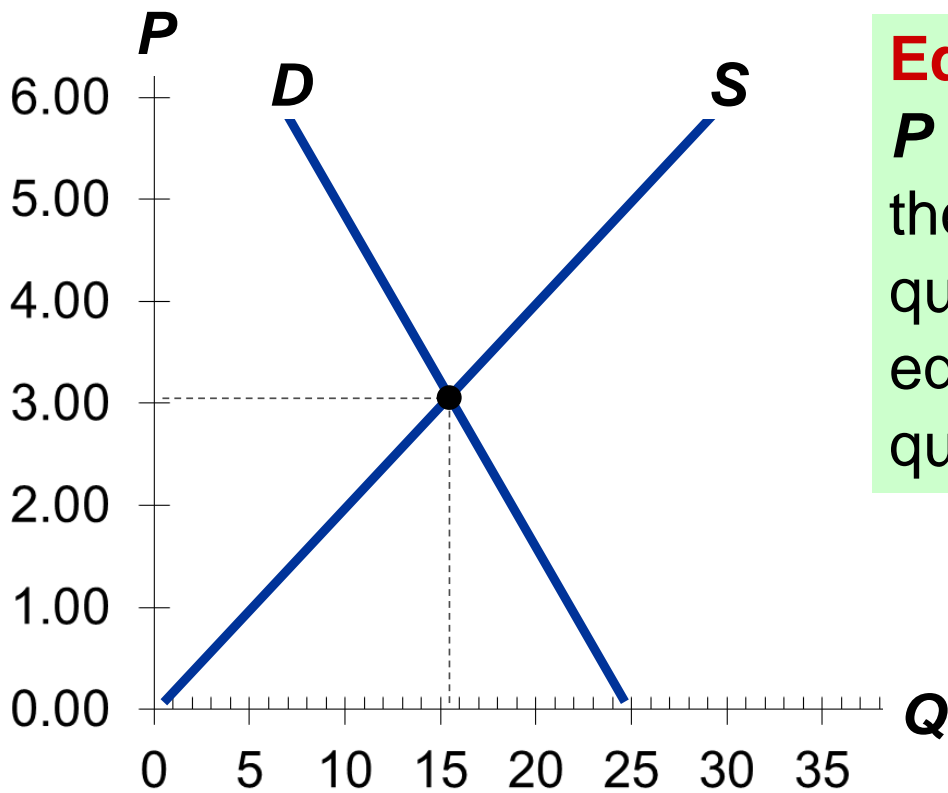
Price of
tax return
software



This shifts the demand curve for tax preparation software, not the supply curve.

Quantity of tax
return software

Supply and Demand Together



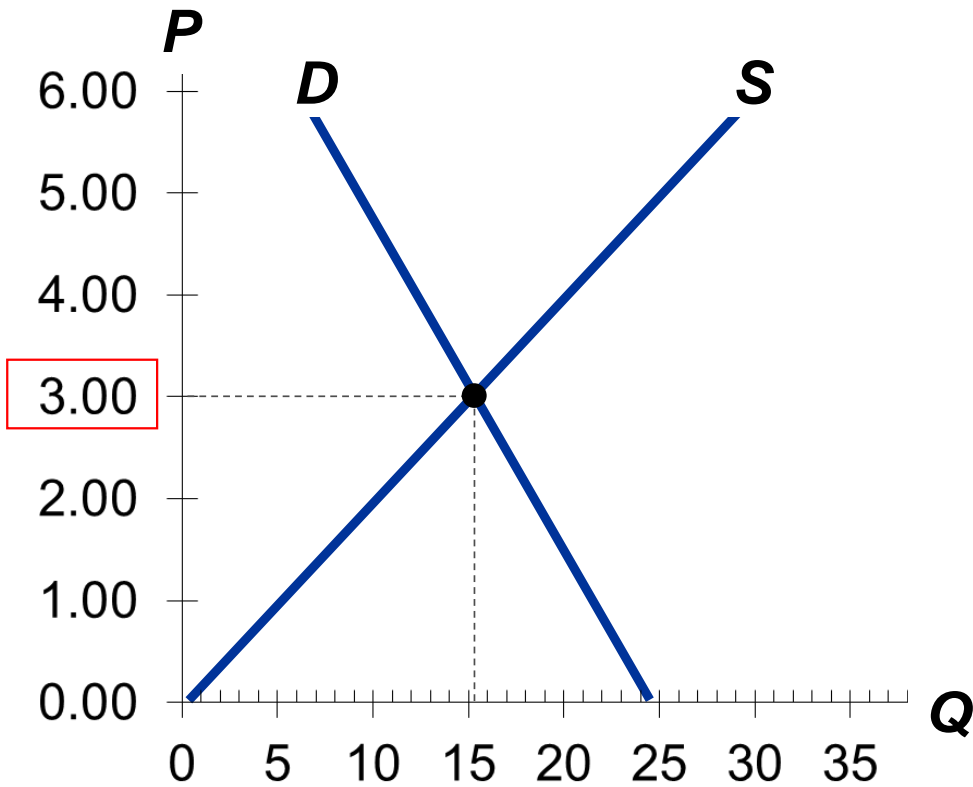
Equilibrium:

P has reached the level where quantity supplied equals quantity demanded

Equilibrium price:

The price that equates quantity supplied (Q^s) with quantity demanded (Q^d)

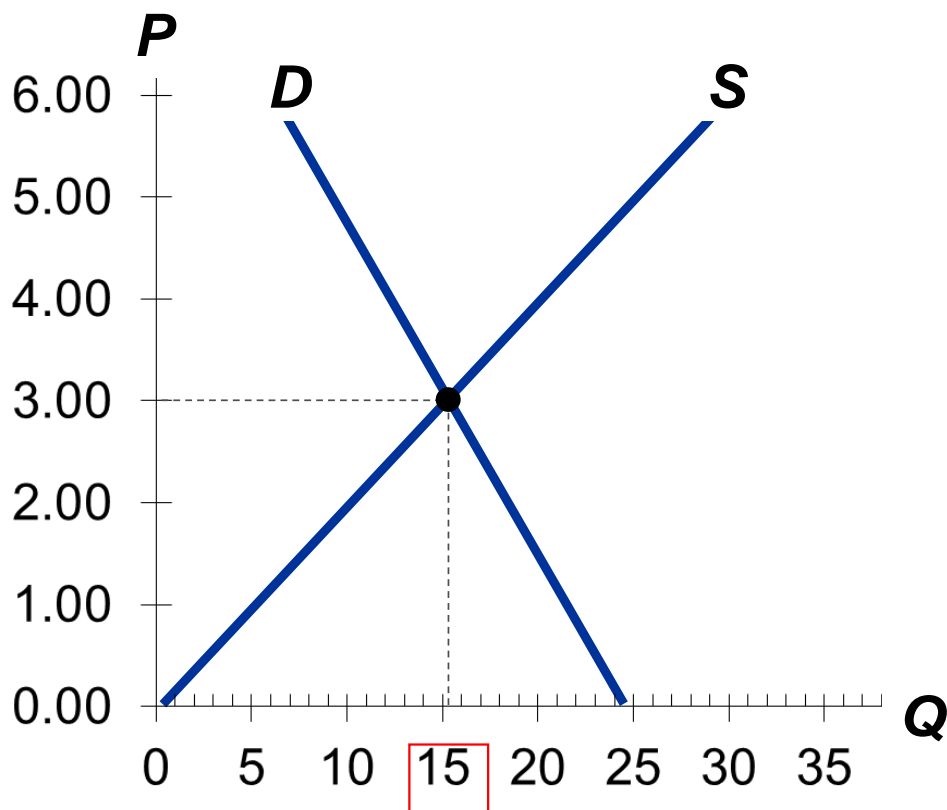
If $Q^d = 24 - 3P$ and $Q^s = 5P$, Equilibrium Price = 3, $Q^d = Q^s = 15$



P	Q^D	Q^S
0	24	0
1	21	5
2	18	10
3	15	15
4	12	20
5	9	25
6	6	30

Equilibrium quantity:

The quantity supplied and quantity demanded at the equilibrium price

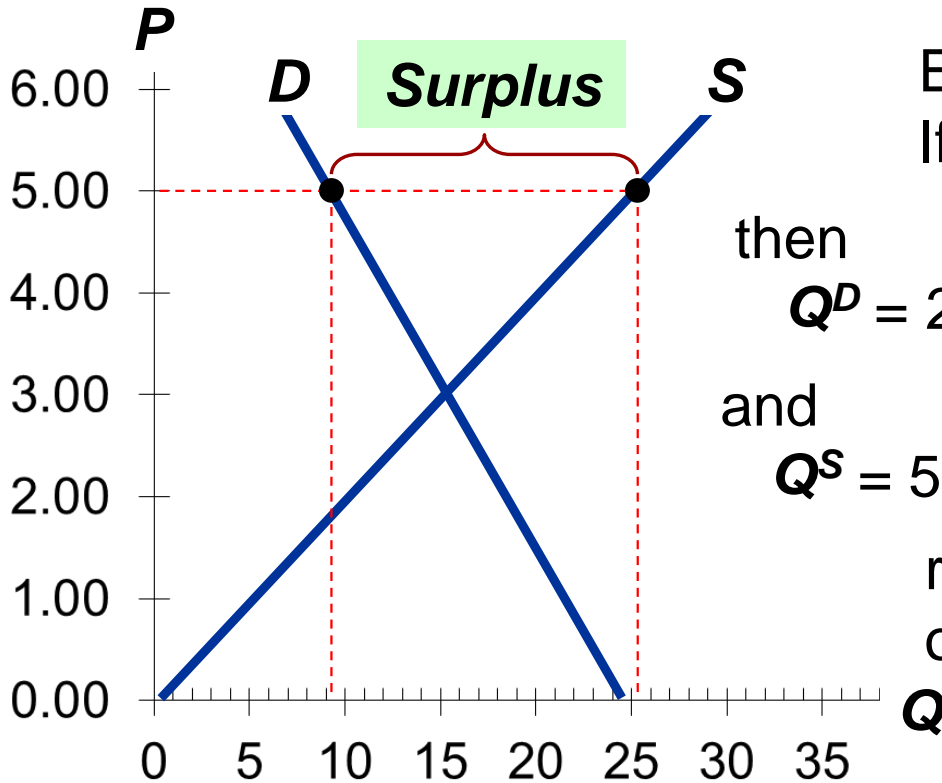


P	Q^D	Q^S
0	24	0
1	21	5
2	18	10
3	15	15
4	12	20
5	9	25
6	6	30

Surplus:

when quantity supplied is greater than quantity demanded

$$Q^d = 24 - 3P \text{ and } Q^s = 5P$$



Example:

If $P = 5$,

then

$$Q^d = 24 - 15 = 9 \text{ Chocolates}$$

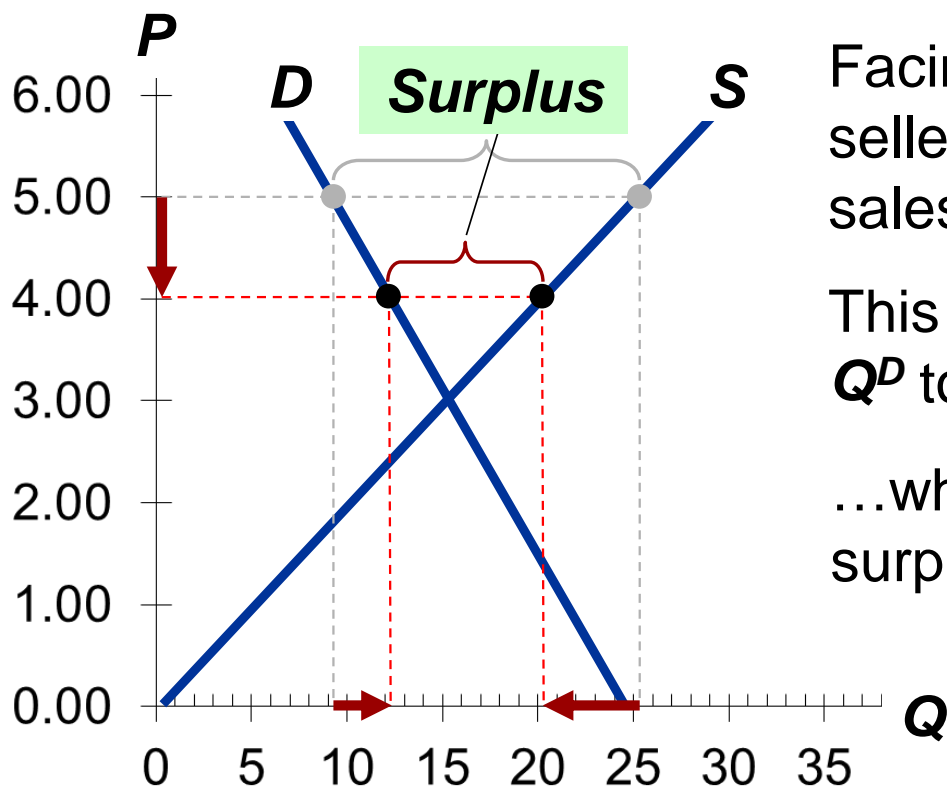
and

$$Q^s = 5 * 5 = 25 \text{ Chocolates}$$

resulting in a surplus
of 16 Chocolates

Surplus:

when quantity supplied is greater than quantity demanded



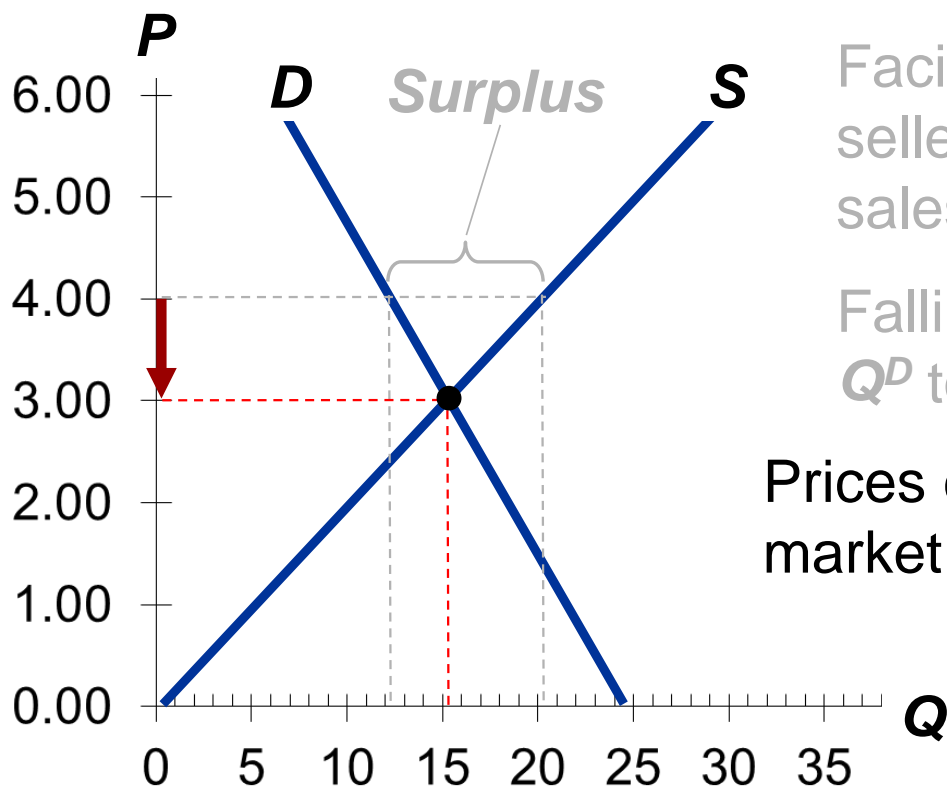
Facing a surplus, sellers try to increase sales by cutting the price.

This causes Q^D to rise and Q^S to fall...

...which reduces the surplus.

Surplus:

when quantity supplied is greater than quantity demanded



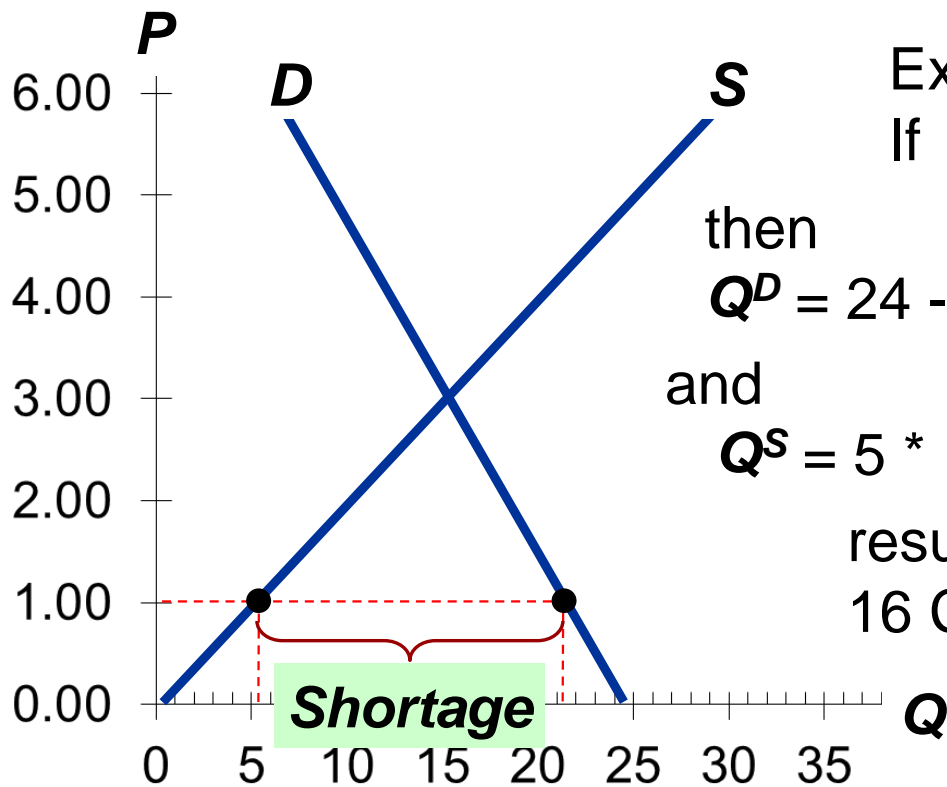
Facing a surplus, sellers try to increase sales by cutting the price.

Falling prices cause Q^D to rise and Q^S to fall.

Prices continue to fall until market reaches equilibrium.

Shortage:

when quantity demanded is greater than quantity supplied
 $Q^d = 24 - 3P$ and $Q^s = 5P$



Example:

If $P = 1$,

then

$Q^D = 24 - 3 = 21$ Chocolates

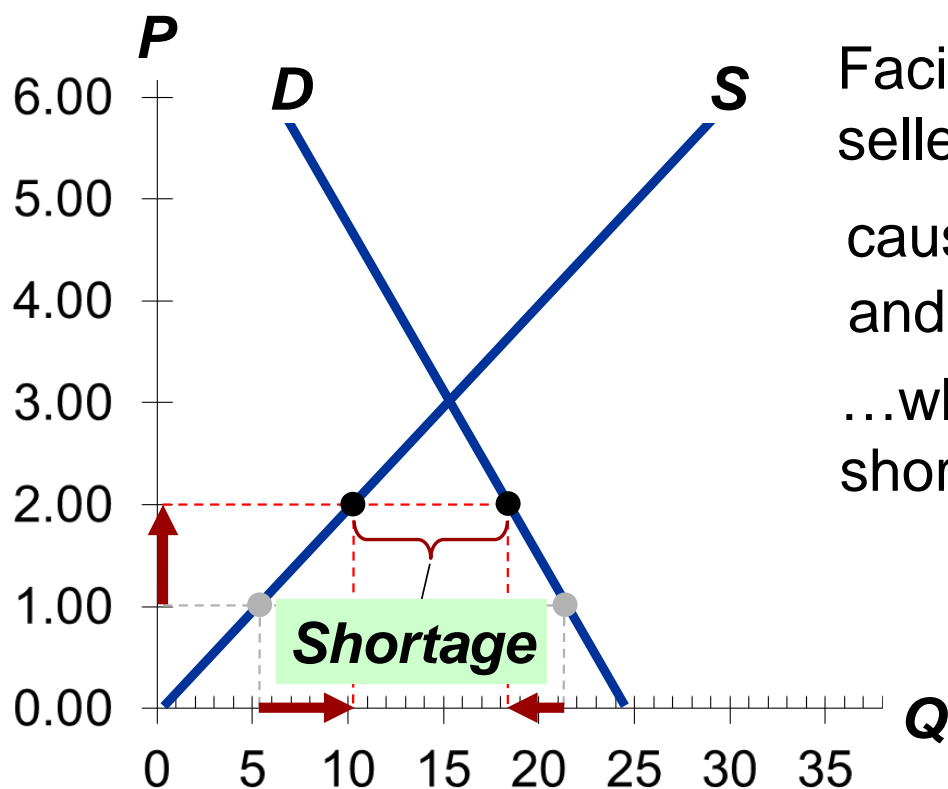
and

$Q^S = 5 * 1 = 5$ Chocolates

resulting in a shortage of
16 Chocolates

Shortage:

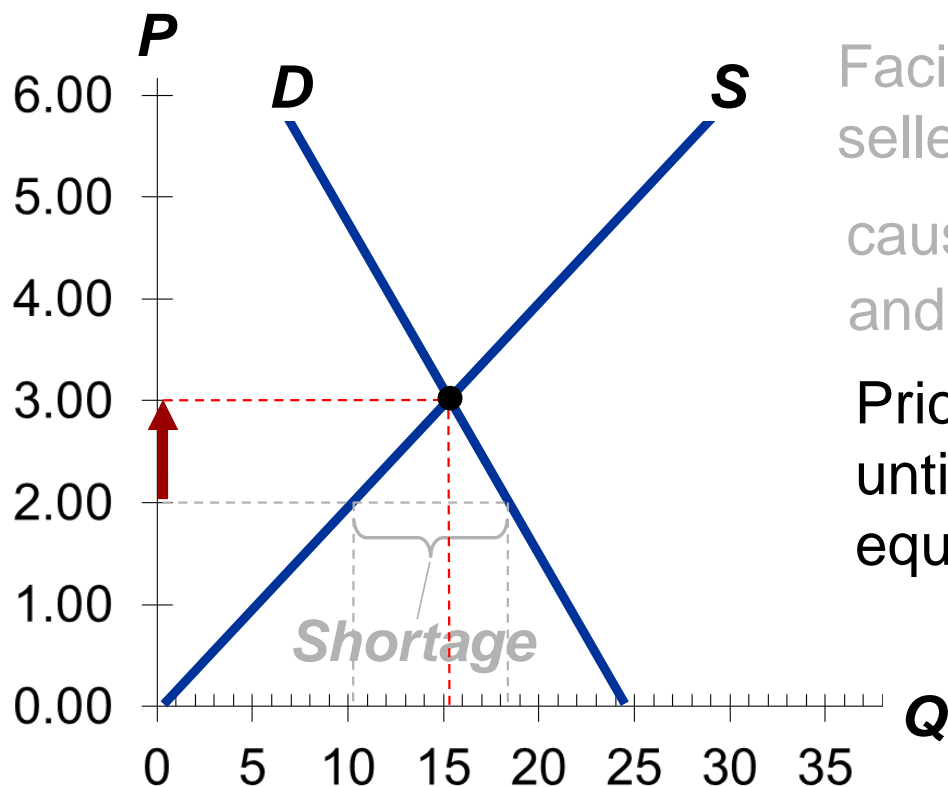
when quantity demanded is greater than quantity supplied



Facing a shortage, sellers raise the price, causing Q^D to fall and Q^S to rise, ...which reduces the shortage.

Shortage:

when quantity demanded is greater than quantity supplied



Facing a shortage, sellers raise the price, causing Q^D to fall and Q^S to rise.

Prices continue to rise until market reaches equilibrium.

Equilibrium, Surplus and Shortage

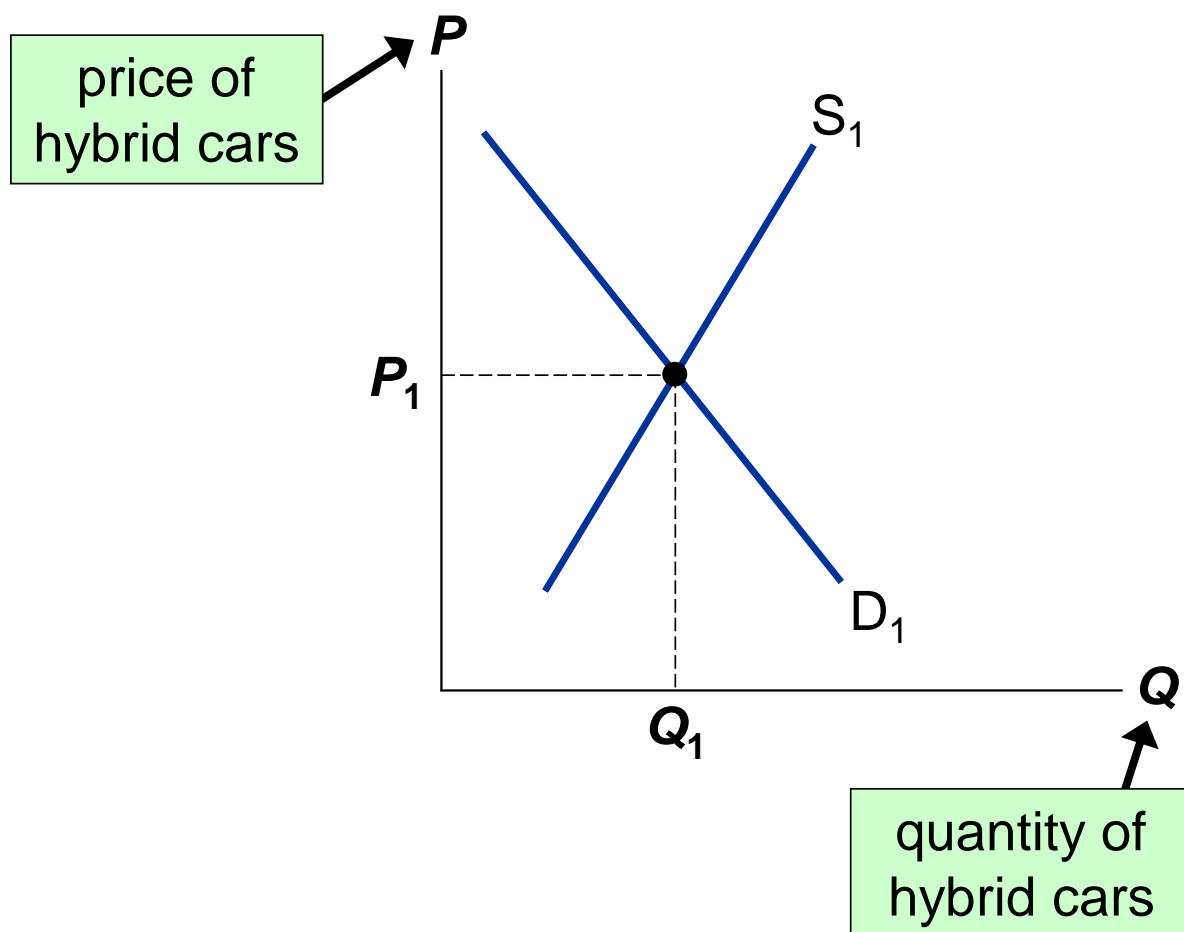
P	Q_D	Q_S	$Q_D - Q_S$	Situation	Price should
0	24	0	24	Shortage	Rise
1	21	5	16	Shortage	Rise
2	18	10	8	Shortage	Rise
3	15	15	0	Equilibrium	Stable
4	12	20	-8	Surplus	Fall
5	9	25	-16	Surplus	Fall
6	6	30	-24	Surplus	Fall

Three Steps to Analyzing Changes in Eq'm

To determine the effects of any event,

1. Decide whether event shifts **S** curve, **D** curve, or both.
2. Decide in which direction curve shifts.
3. Use supply-demand diagram to see how the shift changes equilibrium **P** and **Q**.

EXAMPLE: The Market for Hybrid Cars



EXAMPLE 1: A Change in Demand

**EVENT TO BE
ANALYZED:**

Increase in price of gas.

STEP 1:

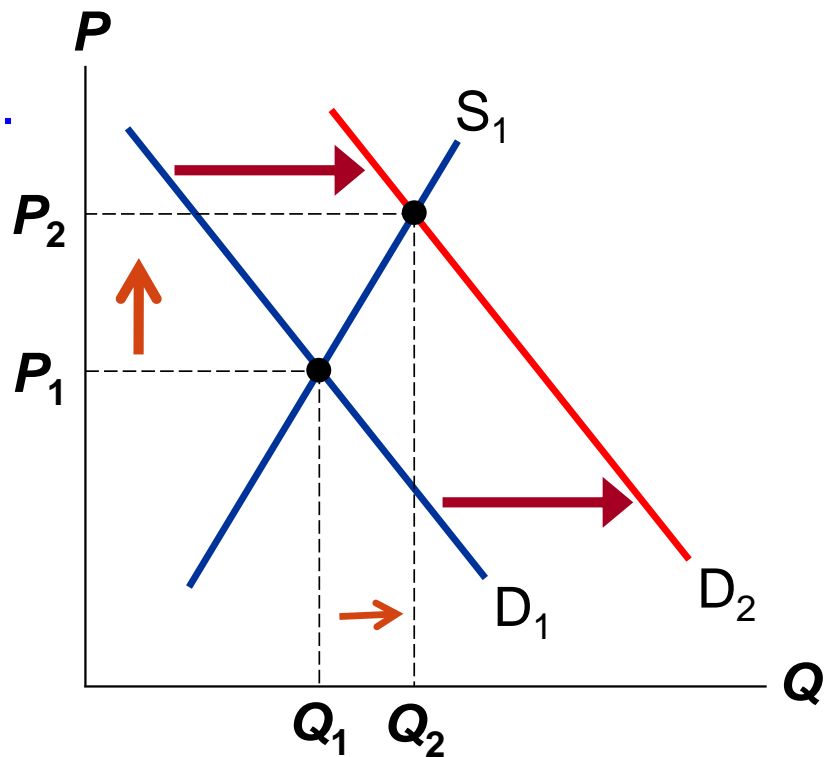
D curve shifts

STEP 2:

D shifts right

STEP 3:

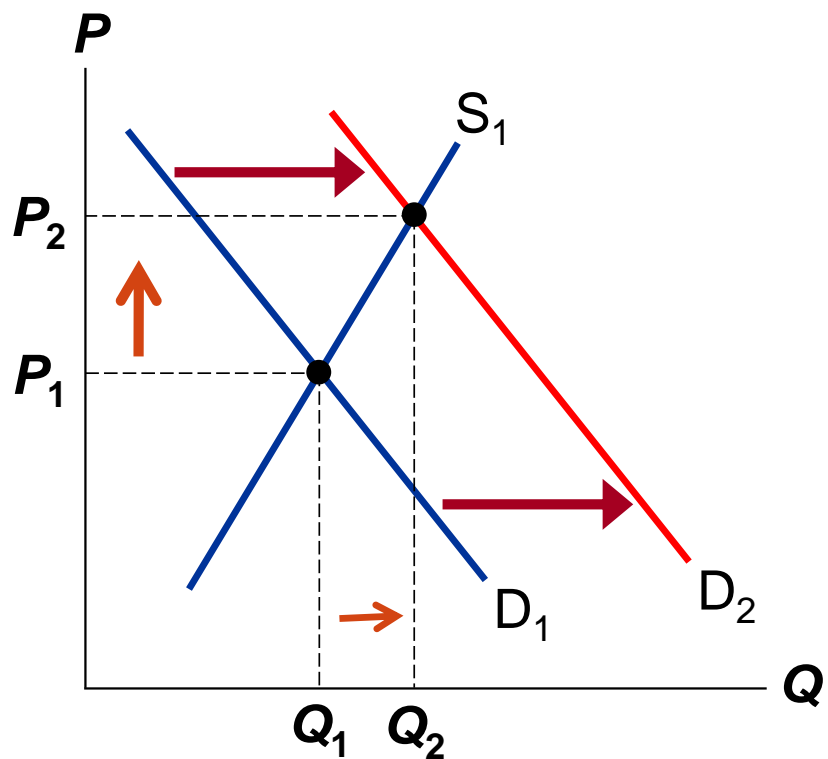
The shift causes an increase in price and quantity of hybrid cars.



EXAMPLE 1: A Change in Demand

Notice: When P rises, producers supply a larger quantity of hybrids, even though the S curve has not shifted.

Always be careful to distinguish b/w a shift in a curve and a movement along the curve.



EXAMPLE 2: A Change in Supply

EVENT: New technology reduces cost of producing hybrid cars.

STEP 1:

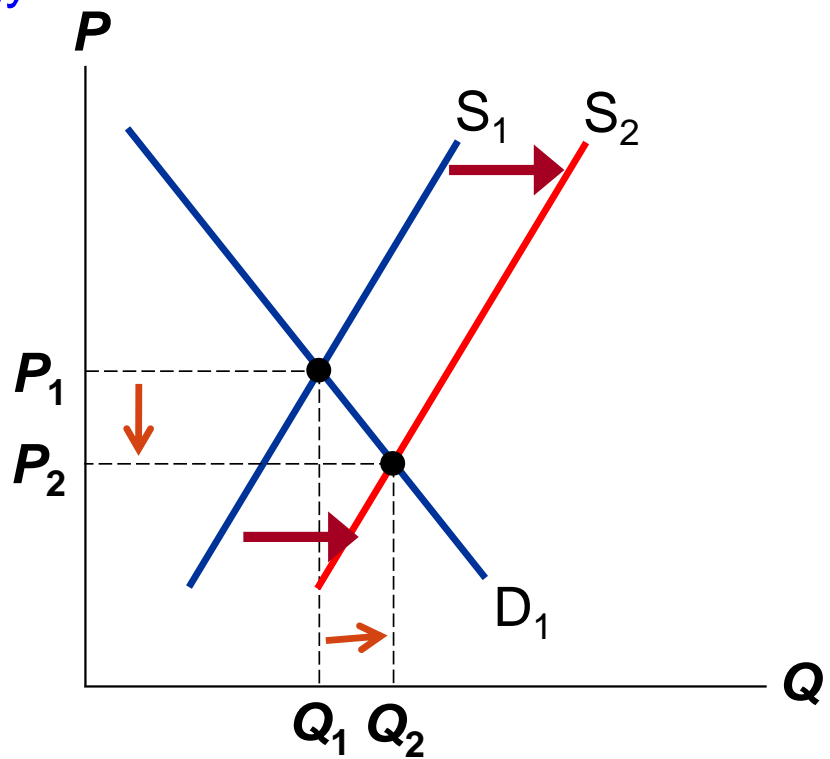
S curve shifts

STEP 2:

S shifts right

STEP 3:

The shift causes price to fall and quantity to rise.



EXAMPLE 3: A Change in Both Supply and Demand

EVENTS:

Price of gas rises AND
new technology reduces
production costs

STEP 1:

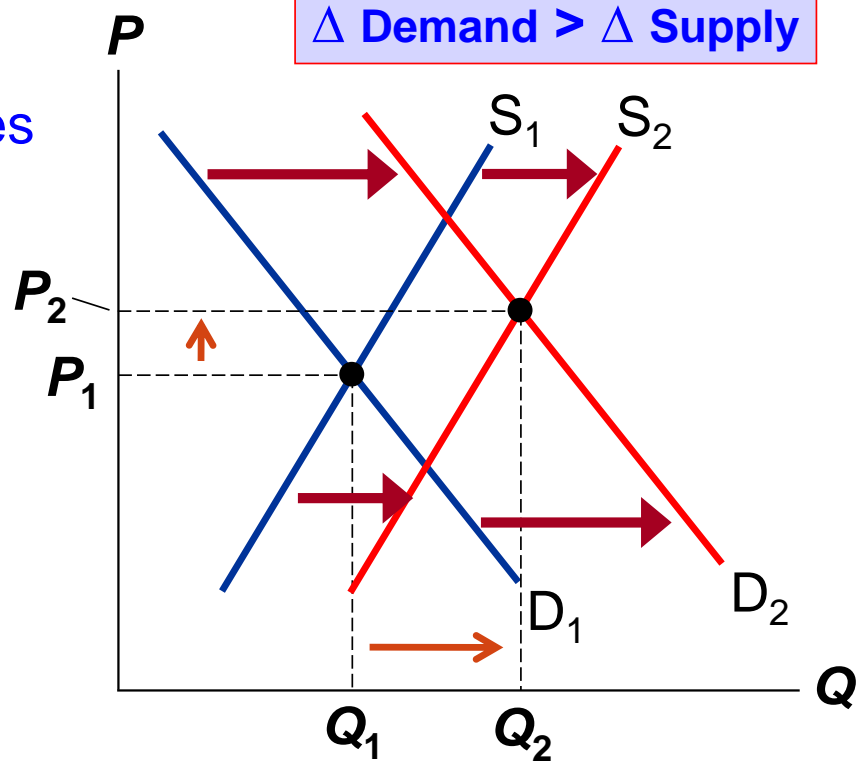
Both curves shift.

STEP 2:

Both shift to the right.

STEP 3:

Q rises, but effect
on P is ambiguous:
If demand increases more
than supply, P rises.



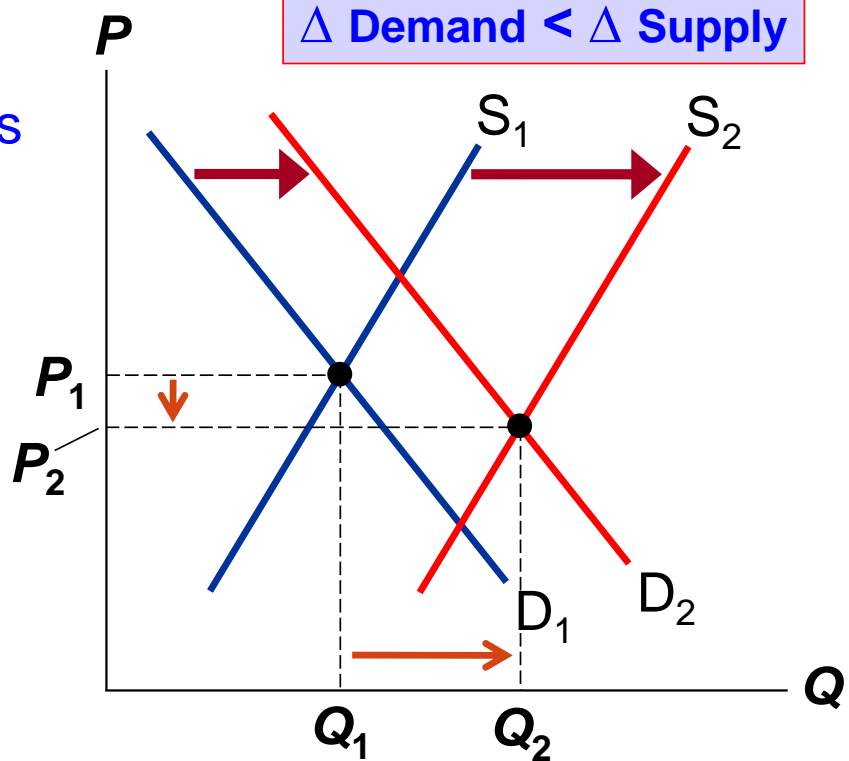
EXAMPLE 3: A Change in Both Supply and Demand

EVENTS:

Price of gas rises AND
new technology reduces
production costs

STEP 3, cont.

But if supply
increases more
than demand,
Price falls.



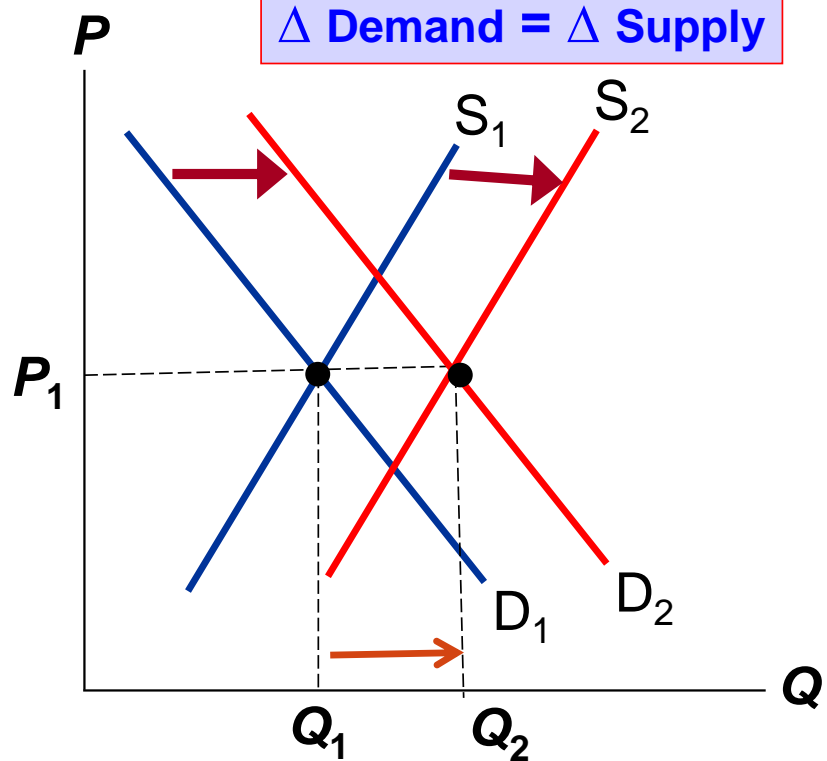
EXAMPLE 3: A Change in Both Supply and Demand

EVENTS:

Price of gas rises AND
new technology reduces
production costs

STEP 3, cont.

But if increase in
supply is equal to
increase in demand,
quantity increases
but **price** remains
constant.



Worked Example

Quantity demanded and supplied of ice-cream in Bhubaneswar market at various possible prices are given in the following schedule.

Price (per cup)	5	10	15	20	25
Demand (No. of Cups)	30000	25000	20000	15000	10000
Supply (No. of Cups)	10000	15000	20000	25000	30000

- (a) Find the price and quantity demanded and supplied at equilibrium.
- (b) Analyse the market situation if the market price is Rs. 20.
- (c) In the hot summer it is expected that demand will change by 5000 cups at each possible prices. It is also expected that the supply of ice-cream will change by 5000 units at each possible prices if the price of milk increases. Analyse the market situation if there is a hot summer and at same time the price of milk increases.

Worked Example - Answer

Quantity demanded and supplied of ice-cream in Bhubaneswar market at various possible prices are given in the following schedule.

Price (per cup)	5	10	15	20	25
Demand (No. of Cups)	30000	25000	20000	15000	10000
Supply (No. of Cups)	10000	15000	20000	25000	30000

(a) *Find the price and quantity demanded and supplied at equilibrium.*

Answer:

Market will be in equilibrium when quantity demanded is equal to quantity supplied. At price Rs. 15 per cup of ice-cream, quantity demanded in the market is 20000 cups and quantity supplied is also 20,000 cups of ice-cream.

Therefore, the equilibrium price for ice-cream is Rs. 15 per cup and the equilibrium quantity demanded and supplied is 20000 cups.

Worked Example - Answer

Quantity demanded and supplied of ice-cream in Bhubaneswar market at various possible prices are given in the following schedule.

Price (per cup)	5	10	15	20	25
Demand (No. of Cups)	30000	25000	20000	15000	10000
Supply (No. of Cups)	10000	15000	20000	25000	30000

(b) *Analyse the market situation if the market price is Rs. 20.*

Since market price is Rs. 20 per cup which is higher than the equilibrium price (Rs. 15), quantity demanded will decrease and quantity supplied will increase. At price Rs. 20 per cup quantity demanded decreases by 5000 cups and quantity supplied increases by 5000 cups. Therefore, a surplus of 10000 cups of ice-cream remain unsold in the market.

The surplus amount of ice-cream results a fall in the price of the ice-cream and play of market mechanism brings equilibrium in to market when price reaches at Rs. 15 per cup.

Worked Example - Answer

- (c) *In the hot summer it is expected that demand will change by 5000 cups at each possible prices. It is also expected that the supply of ice-cream will change by 5000 units at each possible prices if the price of milk increases. Analyse the market situation if there is a hot summer and at same time the price of milk increases.*

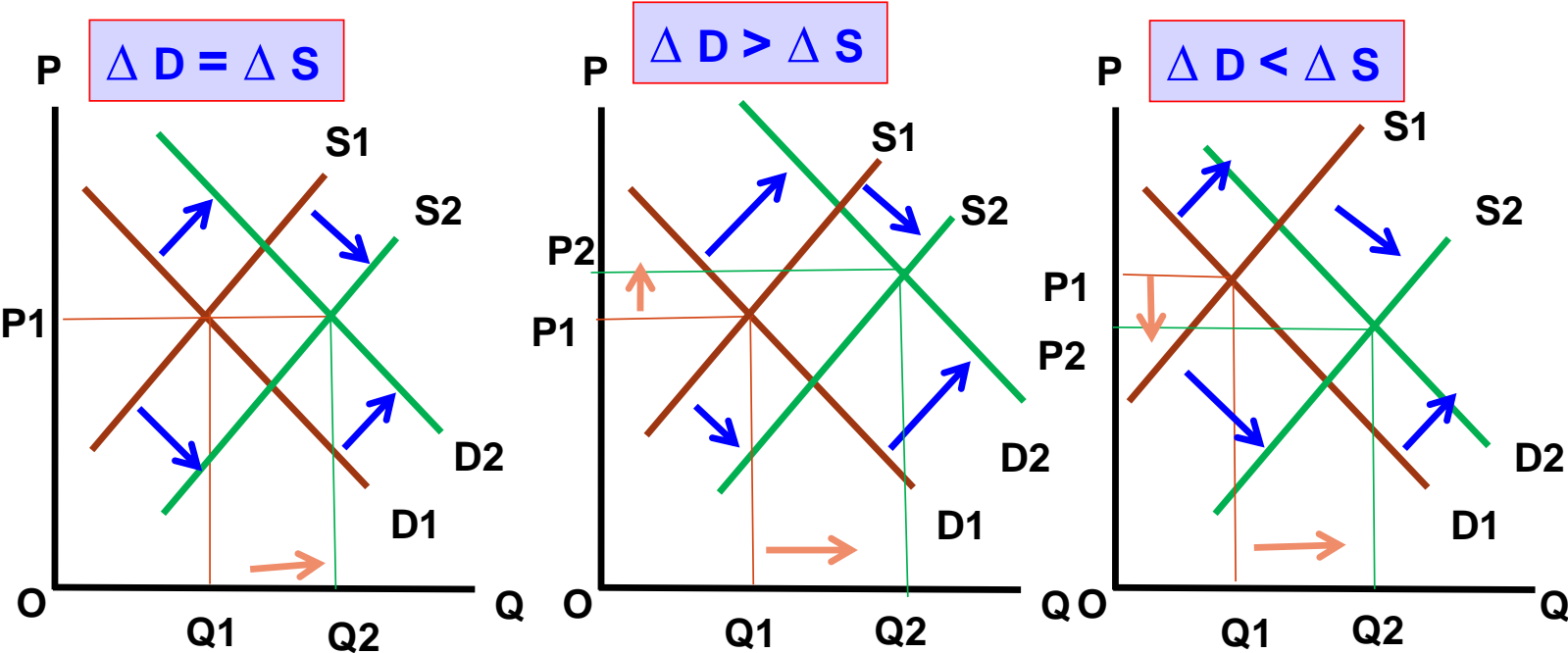
Due to hot summer demand for ice-cream increases. Since milk is an input for production of ice-cream, increase in milk price reduces the supply of ice-cream.

Because of hot summer and increase in milk prices, the new demand schedule will be as follows.

Price (per cup)	5	10	15	20	25
Demand (‘000 Cups)	$30 + 5 = 35$	$25 + 5 = 30$	$20 + 5 = 25$	$15 + 5 = 20$	$10 + 5 = 15$
Supply (‘000 Cups)	$10 - 5 = 5$	$15 - 5 = 10$	$20 - 5 = 15$	$25 - 5 = 20$	$30 - 5 = 25$

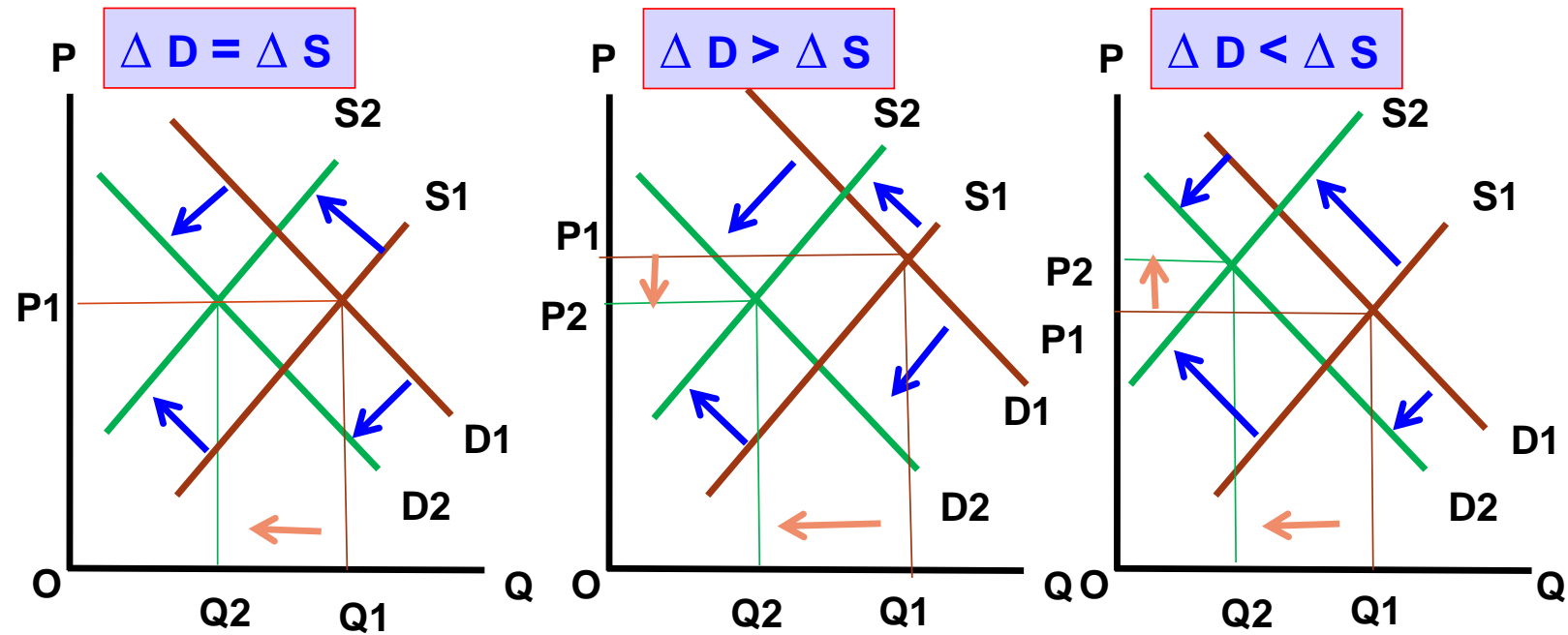
Now, the new equilibrium price increases to Rs. 20. But quantity demanded and supplied remain same at 20000 cups of ice-cream.

Increase in Demand and Increase in Supply



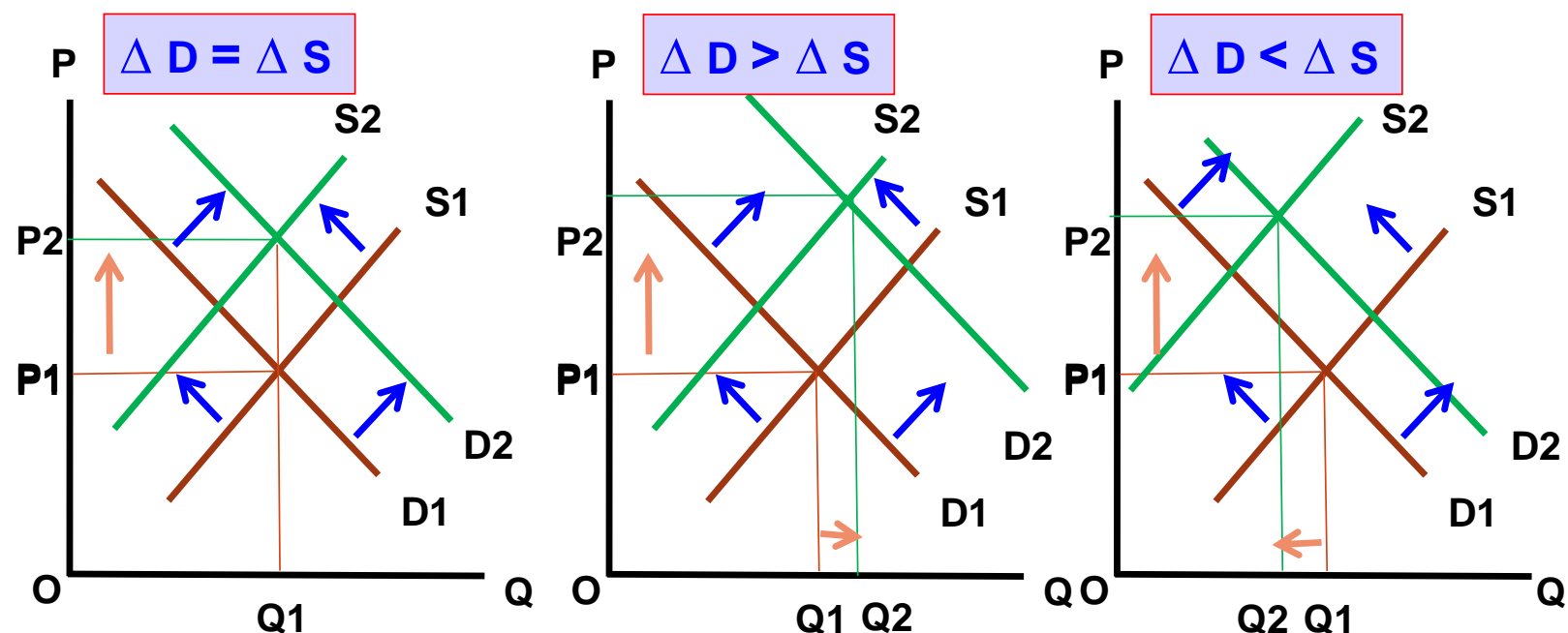
Effect on	Increase in demand and increase in supply			
	$\Delta D = \Delta S$	$\Delta D > \Delta S$	$\Delta D < \Delta S$	Overall
Price	Same	Increase	Decrease	Ambiguous
Q^d and Q^s	Increase	Increase	Increase	Increase

Decrease in Demand and Decrease in Supply



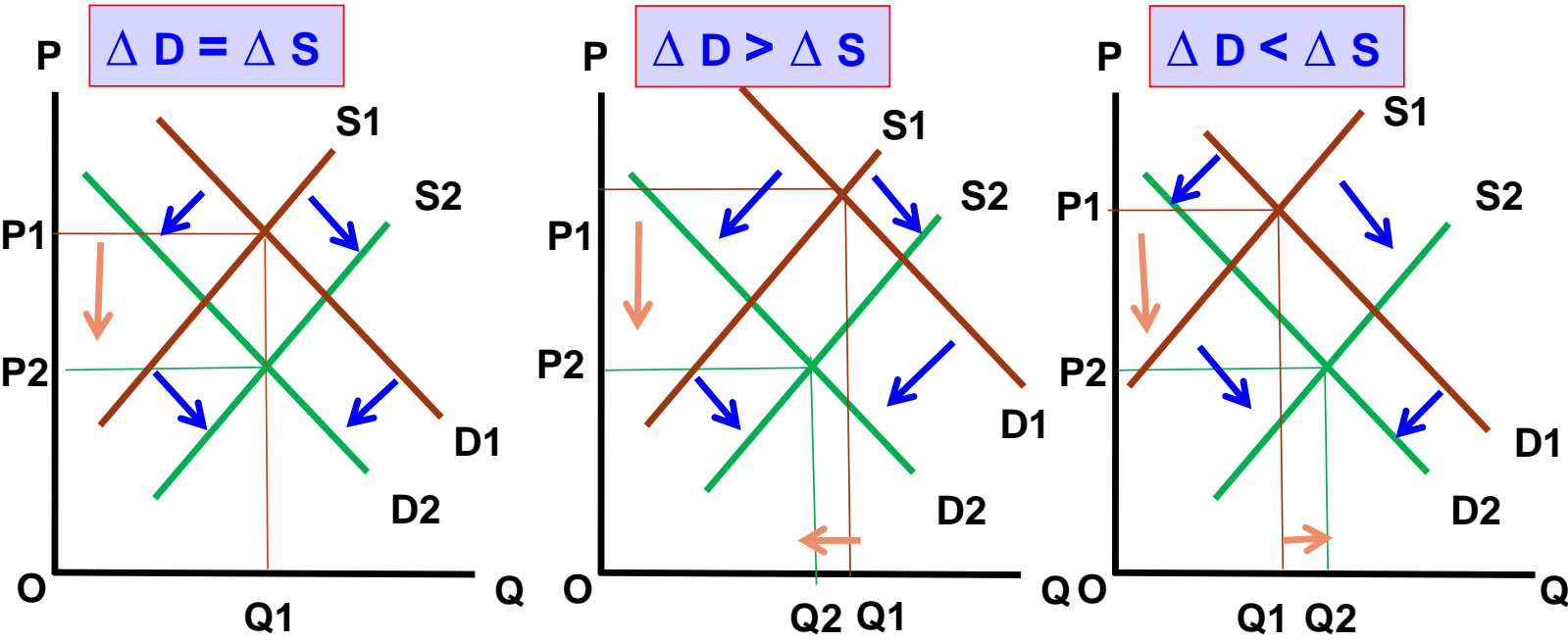
Effect on	Increase in demand and increase in supply			
	$\Delta D = \Delta S$	$\Delta D > \Delta S$	$\Delta D < \Delta S$	Overall
Price	Same	Decrease	Increase	Ambiguous
Q^d and Q^s	Decrease	Decrease	Decrease	Decrease

Increase in Demand and Decrease in Supply



Effect on	Increase in demand and decrease in supply			
	$\Delta D = \Delta S$	$\Delta D > \Delta S$	$\Delta D < \Delta S$	Overall
Price	Increase	Increase	Increase	Increase
Q^d and Q^s	Same	Increase	Decrease	Ambiguous

Decrease in Demand and Increase in Supply



Effect on	Increase in demand and decrease in supply			
	$\Delta D = \Delta S$	$\Delta D > \Delta S$	$\Delta D < \Delta S$	Overall
Price	Decrease	Decrease	Decrease	Decrease
Q^d and Q^s	Same	Decrease	Increase	Ambiguous

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

- When both demand and supply are changing, one of the equilibrium outcomes (price or quantity) is predictable and one is ambiguous.
- Before combining the two shifting curves, predict changes in price and quantity for each shift, by itself.
- The variable that is rising in one case and falling in the other case is your ambiguous prediction.

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

	No Change in Supply	Supply Increases	Supply Decreases
No change in demand	P same Q same	P down Q up	P up Q down
Demand increases	P up Q up	P ambiguous Q up	P up Q ambiguous
Demand decreases	P down Q down	P down Q ambiguous	P ambiguous Q down

ACTIVE LEARNING 3:

Changes in supply and demand

Use the three-step method to analyze the effects of each event on the equilibrium price and quantity of music downloads.

Event A: A fall in the price of compact discs

Event B: Sellers of music downloads negotiate a reduction in the royalties they must pay for each song they sell.

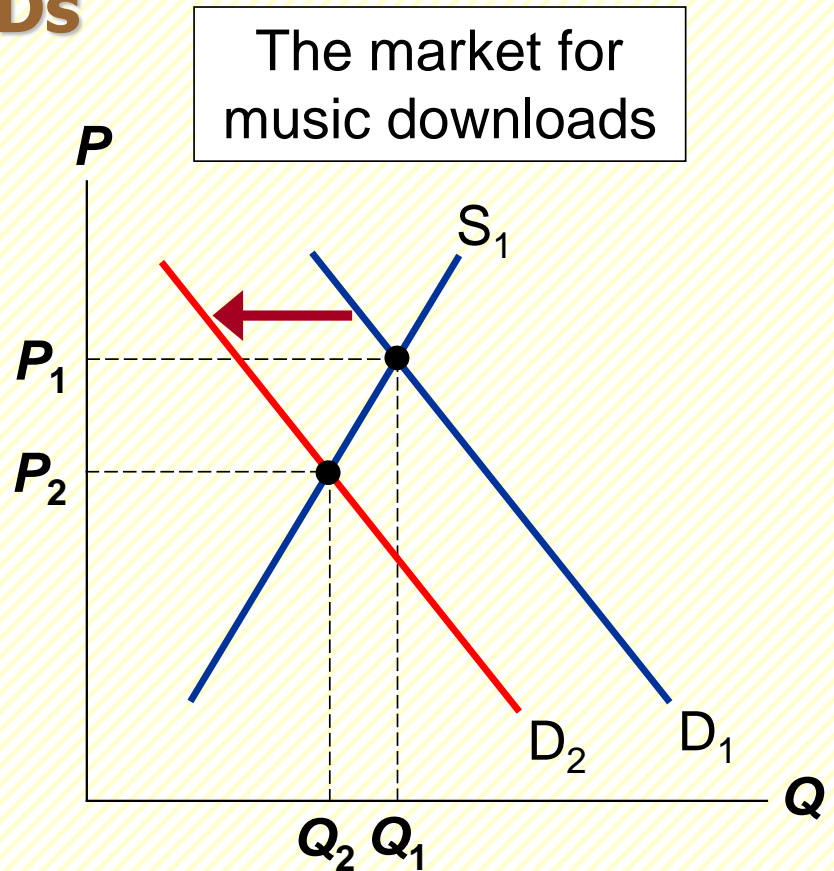
Event C: Events A and B both occur.

ACTIVE LEARNING 3:

A. fall in price of CDs

STEPS

1. **D** curve shifts
2. **D** shifts left
3. **P** and **Q** both fall.

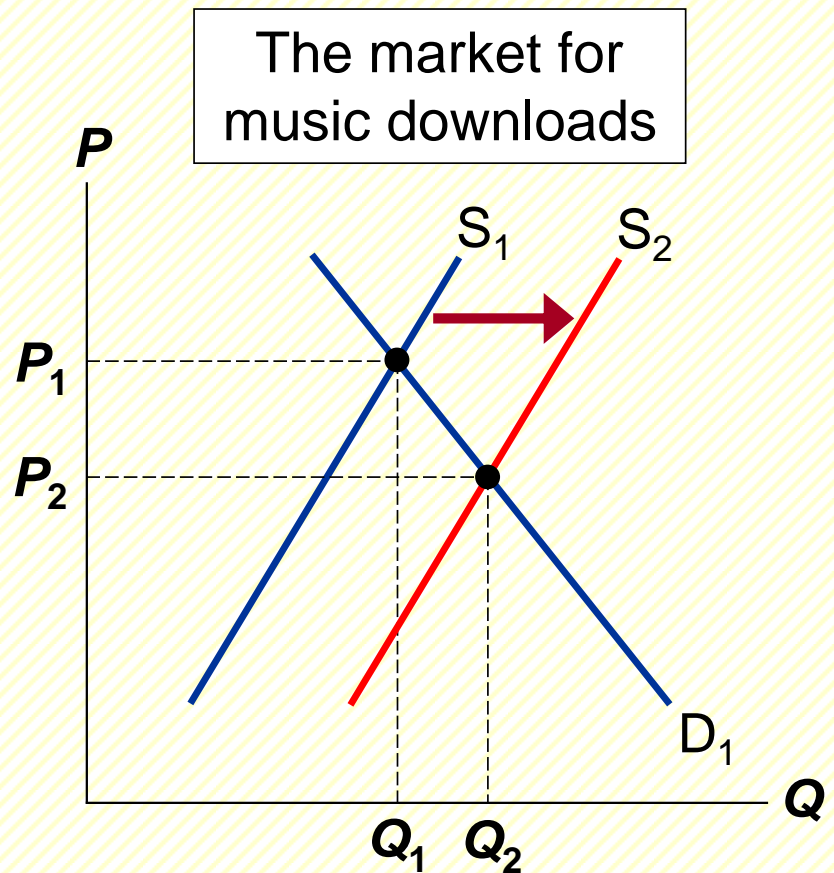


ACTIVE LEARNING 3:

B. fall in cost of royalties

STEPS

1. **S** curve shifts
2. **S** shifts right
(royalties are part of sellers' costs)
3. **P** falls,
Q rises.



ACTIVE LEARNING 3:

C. fall in price of CDs AND fall in cost of royalties

STEPS

1. Both curves shift (see parts A & B).
2. **D** shifts left, **S** shifts right.
3. **P** unambiguously falls.

Effect on **Q** is ambiguous:

The fall in demand reduces **Q**,
the increase in supply increases **Q**.

CHAPTER SUMMARY

- A competitive market has many buyers and sellers, each of whom has little or no influence on the market price.
- Economists use the supply and demand model to analyze competitive markets.
- The downward-sloping demand curve reflects the Law of Demand, which states that the quantity buyers demand of a good depends negatively on the good's price.

CHAPTER SUMMARY

- Besides price, demand depends on buyers' incomes, tastes, expectations, the prices of substitutes and complements, and number of buyers. If one of these factors changes, the **D** curve shifts.
- The upward-sloping supply curve reflects the Law of Supply, which states that the quantity sellers supply depends positively on the good's price.
- Other determinants of supply include input prices, technology, expectations, and the number of sellers. Changes in these factors shift the **S** curve.

CHAPTER SUMMARY

- The intersection of **S** and **D** curves determine the market equilibrium. At the equilibrium price, quantity supplied equals quantity demanded.
- If the market price is above equilibrium, a surplus results, which causes the price to fall. If the market price is below equilibrium, a shortage results, causing the price to rise.

CHAPTER SUMMARY

- We can use the supply-demand diagram to analyze the effects of any event on a market: First, determine whether the event shifts one or both curves. Second, determine the direction of the shifts. Third, compare the new equilibrium to the initial one.
- In market economies, prices are the signals that guide economic decisions and allocate scarce resources.

Home Work - 1

Buyers in the Ice-cream market demand 205 cups of Ice-cream when price is zero and decrease the purchase of Ice-cream by 2 cups for every one unit increase in price.

Suppliers will only start to supply ice-cream cup when a price greater than Rs. 15 per unit is available. They will then increase output by 3 units (3 cups of ice-cream) for every 1 unit (Rs.) increase in price.

- (a) Write down the equation of the demand and supply functions in the form $Q = f(P)$.
- (b) Find out equilibrium price and quantity demanded and supplied in the market. Use both graph and algebraic equations.
- (c) Analyse the market if the actual price is Rs. 75 and Rs. 30 per cup.

Home Work - 2

Using demand and supply model, answer the following questions.

- a) Suppose bicycle market is in equilibrium. If the price of aluminium falls, and all other variables are held constant, what would you expect for the new price and quantity of bicycles?
- b) Suppose the market for tea is in equilibrium. Consumers are expecting that the price of tea will increase in future in the market. If all other variable are held constant, what would you expect for the new price and quantity of tea?
- c) The market for apple is in equilibrium. It is observed that the price of fertiliser falls in the market. At the same time, the price of pears, a substitute for apples, is rising. Give a reasonable prediction for the new price and quantity of apples.