


N. Gregory Mankiw

Principles of Economics

Sixth Edition



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The Market Forces of Supply and Demand

Premium PowerPoint Slides by
Modified by Joseph Tao-yi Wang and Ron Cronovich

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

- What factors affect buyers' demand for goods?
- 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?

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Markets and Competition

- A **market** 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.
- **In modern economics,**
- A **market** is a group of buyers and sellers of a particular product trading under certain "rules".
- A **competitive market** is one where buyers and sellers have a negligible effect on price because there are substitutes on either side.

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Markets and Competition

- In 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 modern economics,**
 - There are **perfect substitutes** for both buyers and sellers so you can always "switch"
 - No one can affect market price – each is a "**price taker**" since others can always "switch"
- In this chapter, we assume markets are perfectly competitive.

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Demand

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

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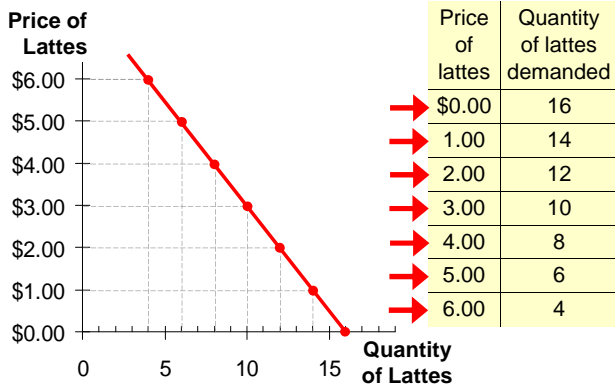
The Demand Schedule

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

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

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Helen's Demand Schedule & Curve



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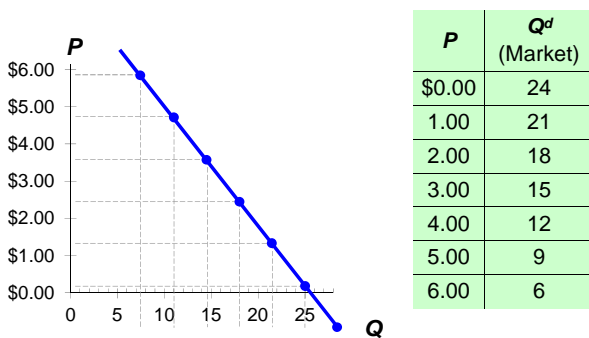
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Market Demand versus Individual Demand

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

Price	Helen's Q^d	Ken'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 Lattes



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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).
- Changes in them shift the **D** curve...

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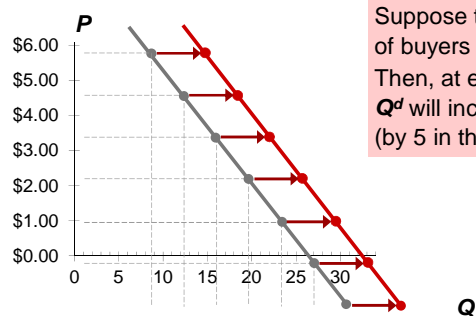
Demand Curve Shifters: # of Buyers

- Increase in # of buyers increases quantity demanded at each price, shifts **D** curve to the right.

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Demand Curve Shifters: # of Buyers



Suppose the number of buyers increases. Then, at each **P**, Q^d will increase (by 5 in this example).

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Demand Curve Shifters: Income

- Demand for a **normal good** is positively related to income.
 - Increase in income causes increase in quantity demanded at each price, shifts **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.)

Demand Curve Shifters: Prices of Related Goods

- Two goods are **substitutes** if an increase in the price of one causes an increase in demand for the other.
- Example: pizza and hamburgers. An increase in the price of pizza increases demand for hamburgers, shifting hamburger demand curve to the right.
- Other examples: laptops and desktop computers, CDs and music downloads
- [In the news: Fresh and Frozen Vegetables after a typhoon](#)

Demand Curve Shifters: Prices of Related Goods

- Two goods are **complements** if an increase in the price of one causes a fall in demand for the other.
- Example: computers and software. If price of computers rises, people buy fewer computers, and therefore less software. Software demand curve shifts left.
- Other examples: college tuition and textbooks, bagels and cream cheese, eggs and bacon
- [In the news: gasoline and cars](#)

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 organic diet became popular recently, caused an increase in demand for organic food, shifted the organic demand curve to the right.

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 sours and people worry about their future job security, demand for new autos may fall now.

Summary: Variables That Influence Buyers

Variable	A change in this variable...
Price	...causes a movement along the D curve
# 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

ACTIVE LEARNING 1

Demand Curve

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

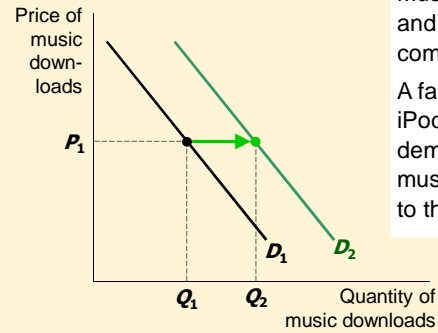
- A. The price of iPods falls
- B. The price of music downloads falls
- C. The price of CDs falls



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ACTIVE LEARNING 1

A. Price of iPods falls

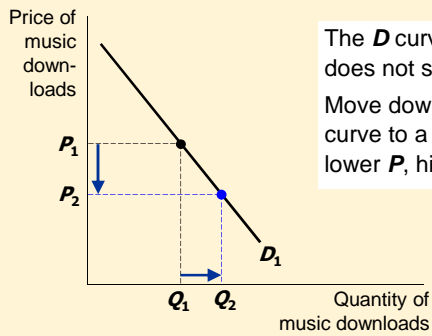


Music downloads and iPods are complements.
A fall in price of iPods shifts the demand curve for music downloads to the right.

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ACTIVE LEARNING 1

B. Price of music downloads falls

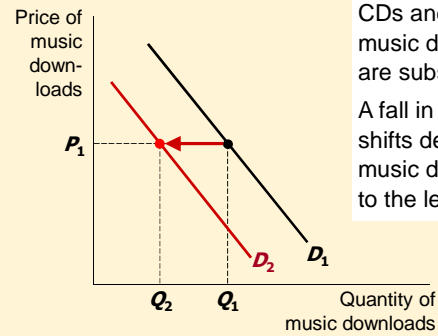


The **D** curve does not shift.
Move down along curve to a point with lower **P**, higher **Q**.

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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.

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Supply

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

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The Supply Schedule

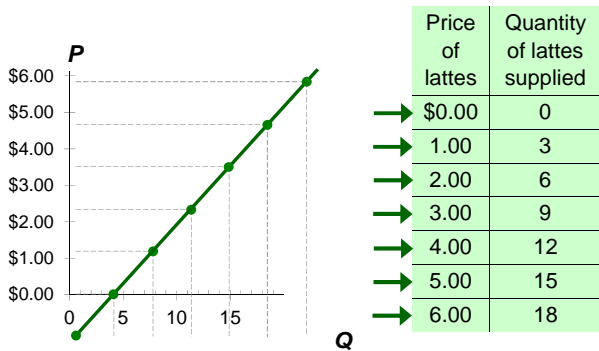
- **Supply schedule**: A table that shows the relationship between the price of a good and the quantity supplied.
- Example: Starbucks' supply of lattes.
- Notice that Starbucks' supply schedule obeys the law of supply.

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

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Starbucks' Supply Schedule & Curve



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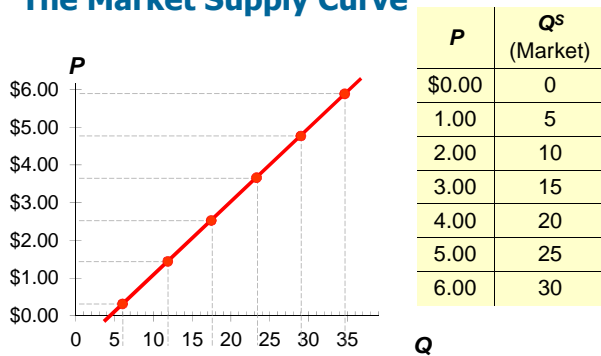
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Market Supply versus Individual Supply

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

Price	Starbucks		Dante		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



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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.
- Changes in them shift the **S** curve...

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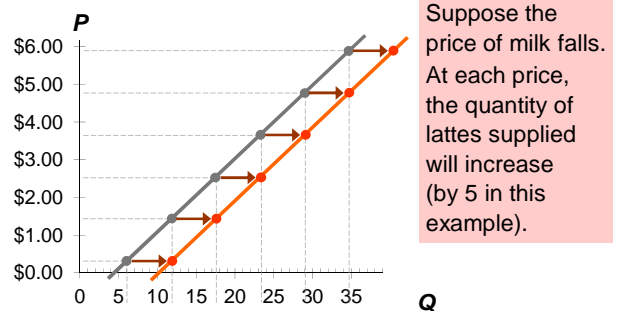
Supply Curve Shifters: Input Prices

- Examples of input prices: wages, prices of raw materials.
- 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.

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Supply Curve Shifters: Input Prices



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Supply Curve Shifters: Technology

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

Supply Curve Shifters: # of Sellers

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

Supply Curve Shifters: Expectations

- Example:
 - Events in the Middle East lead to expectations of higher oil prices.
 - In response, owners of Texas oilfields reduce supply now, save some inventory to sell later at the higher price.
 - S** curve shifts left.
- In general, sellers may adjust supply* when their expectations of future prices change.
(* If good not perishable)

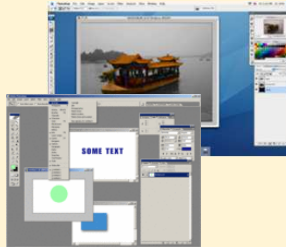
Summary: Variables that Influence Sellers

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
# of Sellers	...shifts the S curve
Expectations	...shifts the S curve

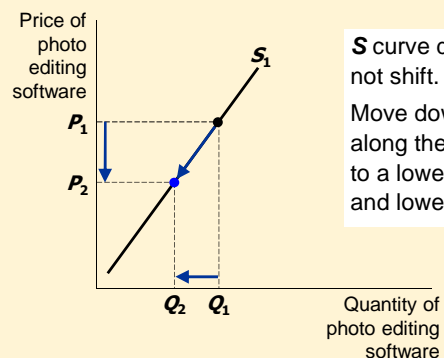
ACTIVE LEARNING 2 Supply Curve

Draw a supply curve for photo editing software. What happens to it in each of the following scenarios?

- Retailers cut the price of the software.
- A technological advance allows the software to be produced at lower cost.
- Professional photoshops raise the price of the services they provide.

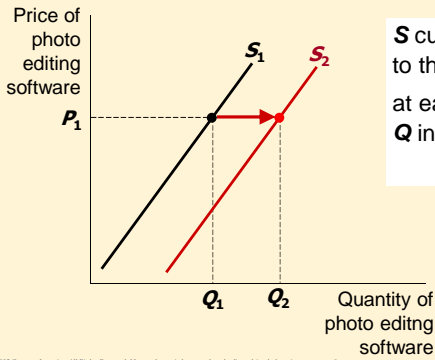


ACTIVE LEARNING 2 A. Fall in price of photo editing software



ACTIVE LEARNING 2

B. Fall in cost of producing the software

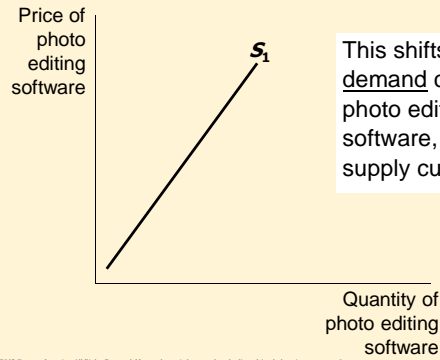


S curve shifts to the right: at each price, Q increases.

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ACTIVE LEARNING 2

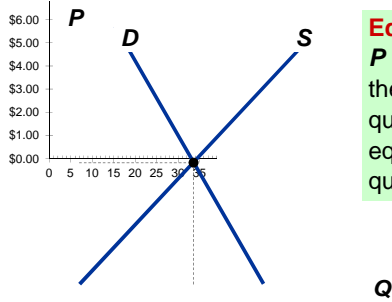
C. Professional photoshops raise their price



This shifts the demand curve for photo editing software, not the supply curve.

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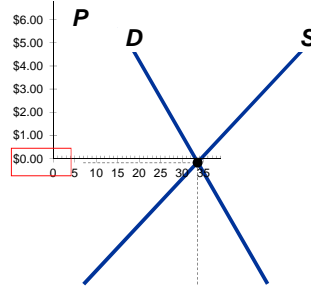
Supply and Demand Together



Equilibrium: P has reached the level where quantity supplied equals quantity demanded

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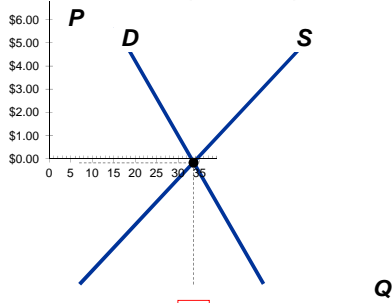
Equilibrium price: the price that equates quantity supplied with quantity demanded



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

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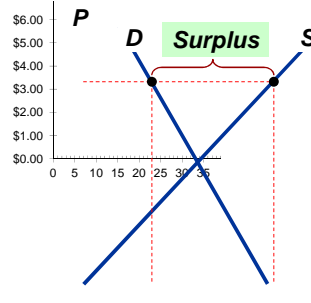
Equilibrium quantity: the quantity supplied and quantity demanded at the equilibrium price



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

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Surplus (a.k.a. excess supply): when quantity supplied is greater than quantity demanded

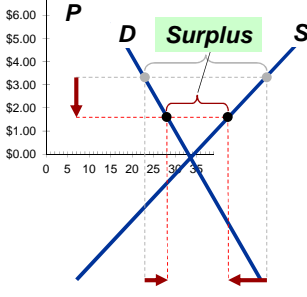


Example: If $P = \$5$, then $Q^D = 9$ lattes and $Q^S = 25$ lattes resulting in a surplus of 16 lattes

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Surplus (a.k.a. excess supply):

when quantity supplied is greater than quantity demanded

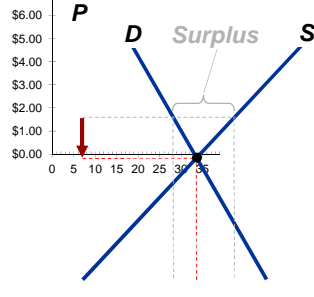


Facing a surplus, sellers try to increase sales by cutting price. This causes Q^D to rise and Q^S to fall... which reduces the surplus.

Q

Surplus (a.k.a. excess supply):

when quantity supplied is greater than quantity demanded

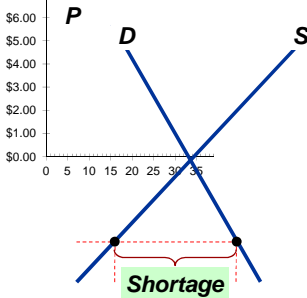


Facing a surplus, sellers try to increase sales by cutting price. This causes Q^D to rise and Q^S to fall. Prices continue to fall until market reaches equilibrium.

Q

Shortage (a.k.a. excess demand):

when quantity demanded is greater than quantity supplied

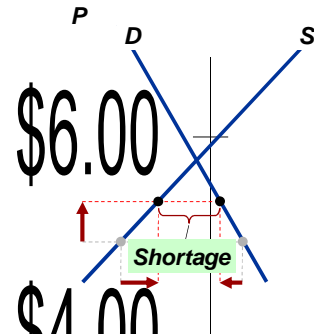


Example: If $P = \$1$, then $Q^D = 21$ lattes and $Q^S = 5$ lattes resulting in a shortage of 16 lattes

Q

Shortage (a.k.a. excess demand):

when quantity demanded is greater than quantity supplied

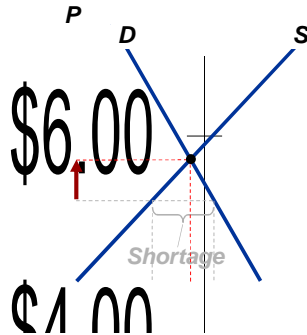


Facing a shortage, sellers raise the price, causing Q^D to fall and Q^S to rise, ... which reduces the shortage.

Q

Shortage (a.k.a. excess demand):

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.

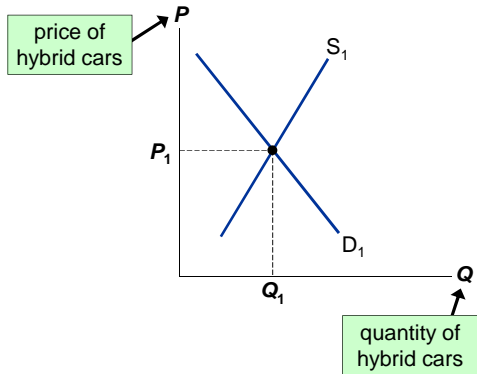
Q

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 eq'm **P** and **Q**.

EXAMPLE: The Market for Hybrid Cars



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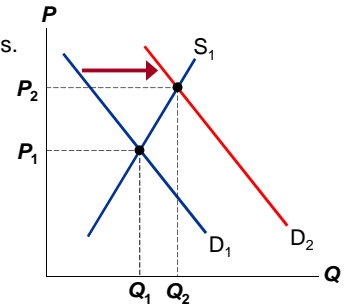
EXAMPLE 1: A Shift in Demand

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.



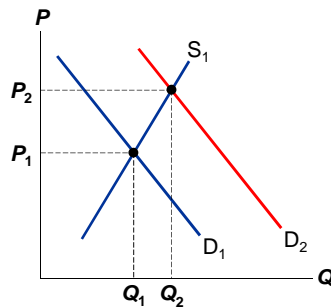
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EXAMPLE 1: A Shift in Demand

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.



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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 # of buyers)
- **Change in the quantity demanded:** a movement along a fixed **D** curve occurs when **P** changes

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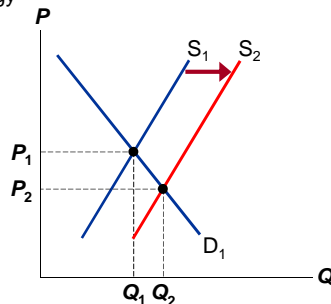
EXAMPLE 2: A Shift in Supply

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.



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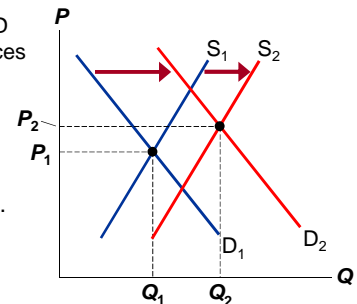
EXAMPLE 3: A Shift in Both Supply and Demand

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.



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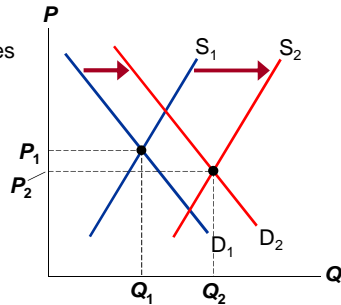
EXAMPLE 3: A Shift in Both Supply and Demand

EVENTS:

price of gas rises AND
new technology reduces
production costs

STEP 3, cont.

But if supply
increases more
than demand,
P falls.



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ACTIVE LEARNING 3

Shifts 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 CDs

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.

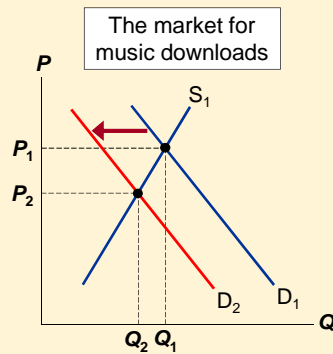
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ACTIVE LEARNING 3

A. Fall in price of CDs

STEPS

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



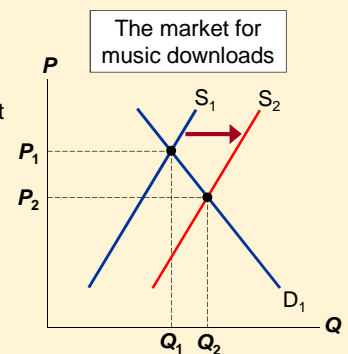
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ACTIVE LEARNING 3

B. Fall in cost of royalties

STEPS

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



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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**.

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CONCLUSION:

How Prices Allocate Resources

- One of the Ten Principles from Chapter 1:
Markets are usually a good way to organize economic activity.
- In market economies, prices adjust to balance supply and demand. These equilibrium prices are the signals that guide economic decisions and thereby allocate scarce resources.

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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.

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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 # of sellers. Changes in these factors shift the **S** curve.

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SUMMARY

- The intersection of **S** and **D** curves determines 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.

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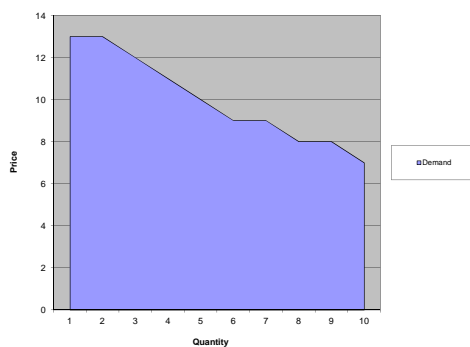
SUMMARY

- 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.

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Seeing the Invisible Hand (2007)

Seeing the Invisible Hand

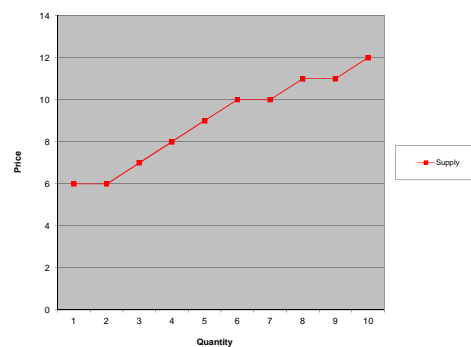


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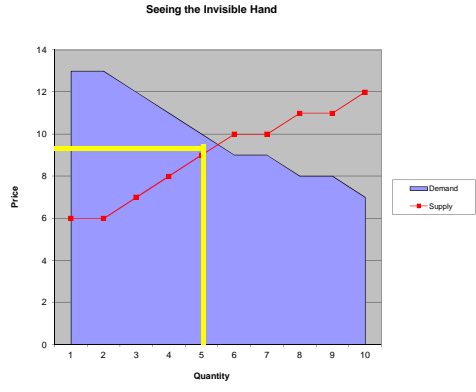
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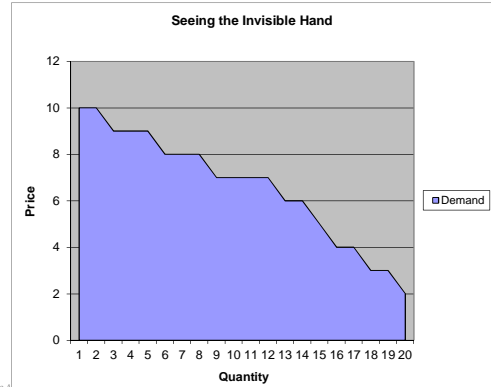
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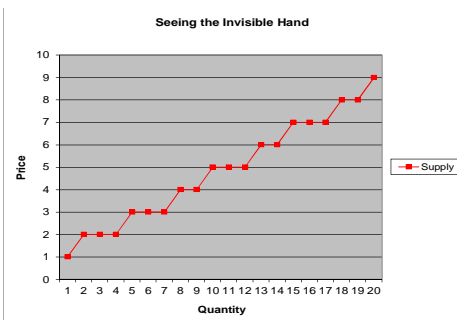
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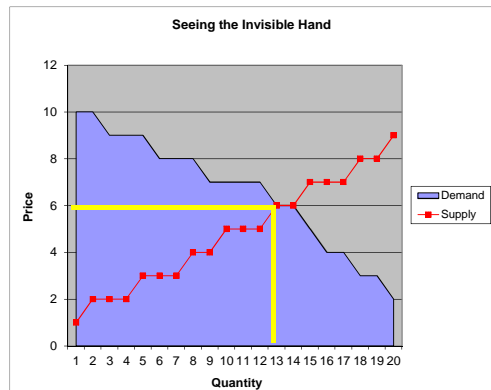
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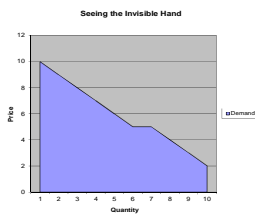
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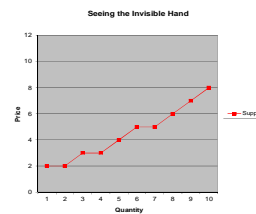
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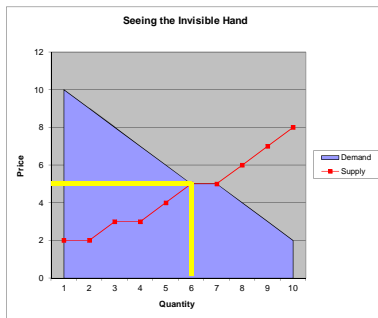
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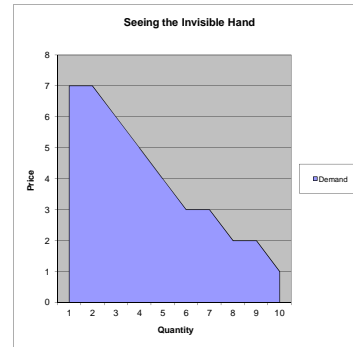
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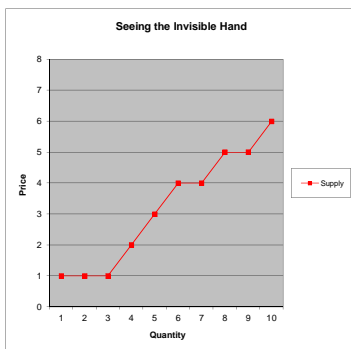
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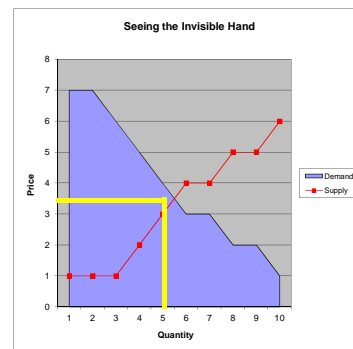
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Summary

- Supply, Demand, and Equilibrium
- Step 1: Identify which curve shifts (or both)
- Step 2: Identify what direction did it shift
- Step 3: Use the S/D graph to find how equilibrium price and quantity change
- Homework: Mankiw, p.86-87, Problem 1, 3, 4, 7, 9, 13, 14

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Additional Homework Questions

- **True or False.** If the demand for lettuce falls, the price will fall, causing the demand to go back up.
- **True or False.** Suppose the enrollment at your university unexpectedly declines. Then the apartment owners in the area will face higher vacancy rates and might raise their rents to compensate.
- **True or False.** The discovery of a new method of birth control that is safer, cheaper, more effective, and easier to use than any other method would reduce the number of unwanted pregnancies.

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