

Demand and Supply in a Market System

- A market system is an interrelated set of markets for goods and services.
- Elements of tradition and command may play minor roles in the allocation process.
- A social infrastructure (trust, morality, law and other social institutions) is required to facilitate the market process.
- A market is the interaction of all potential buyers and sellers of a good or class of goods that are close substitutes

Demand – “the buyers”

- A demand function represents the behavior of all potential buyers in a market
- Each individual has a demand function for goods (Even if they don't want any at any price, the quantity demanded is 0 at all prices)
- There is a market demand function that represents the behavioral patterns of a group of buyers
- The nature of the demand function depends on the characteristics of the goods and the buyers

Demand

- Demand is a model of the behavior of all potential buyers of a good.
- A formal definition is: “A schedule of quantities that a buyer(s) is willing and able to buy at a schedule of prices in a given time period, all other things equal”
 - $Q_x = f_d(P_x)$, *ceteris paribus*
- Demand can also be perceived as the maximum price a buyer will pay for every unit of a good in a given time, all other things equal.
 - $P_x = f_d(Q_x)$, *ceteris paribus*

Individual's Demand Function

- Generally, there is an inverse relationship between the price of the good and the quantity demanded
 - Exceptions:
 - Giffen good
(a positively sloped demand, very rare, if ever)
 - Perfectly inelastic
(buyer purchases the same quantity no matter the price)
 - Perfectly elastic
(this case is not relevant to the analysis of an individual's demand function)

Nature of Individual's Demand

- The behavior of a buyer is influenced by many factors:
 - The price of the good
 - The buyer's income
 - The buyer's preferences, tastes or utility function
 - Preferences may be influenced by:
 - Time of day/year, weather, age, gender, ethnic background, religion or
 - The prices of related goods
 - Substitutes
 - Complements

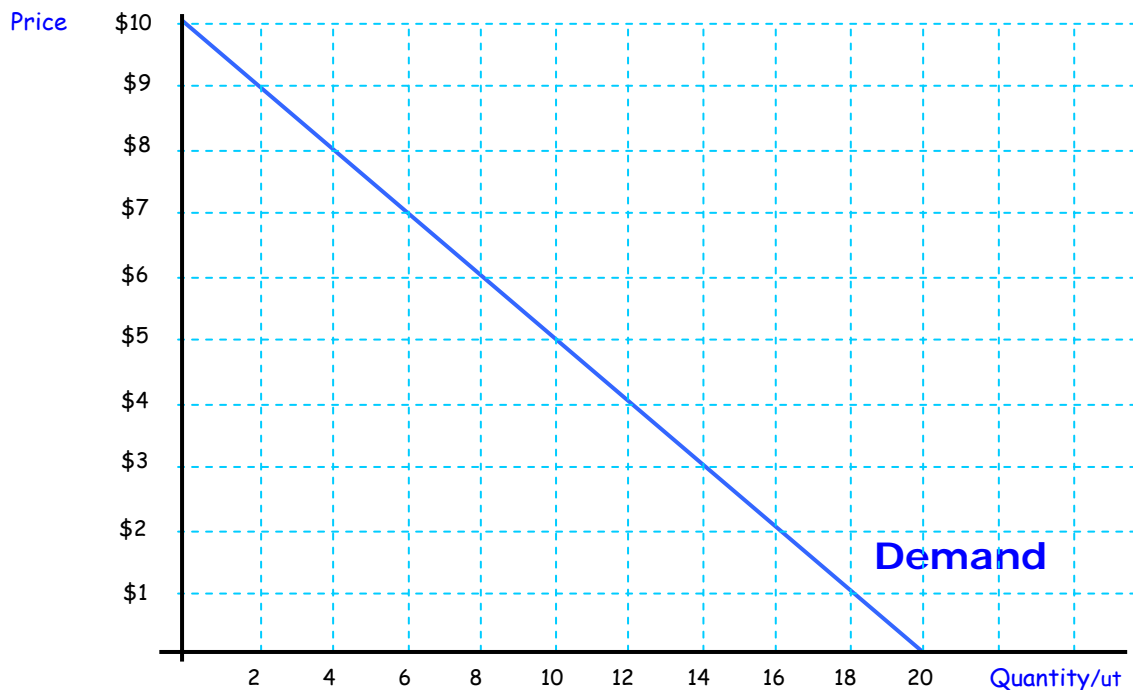
Demand Model (for the individual)

- $Q_X = f_d(P_X, P_R, M, \text{preferences}, \dots)$
- Where:
 - Q_X = the quantity of good X
 - P_X = the price of good X
 - P_R , = the price of related goods
 - Complements
 - Substitutes
 - M = income
 - Preferences (tastes) of the buyer
 - Proxies: age, gender, ethnicity, religion, time of year, weather, etc.

Demand “Curve”

- If P_R , M and Preferences do not change, then

$$Q_X = f_X(P_X) \text{ ceteris paribus}$$

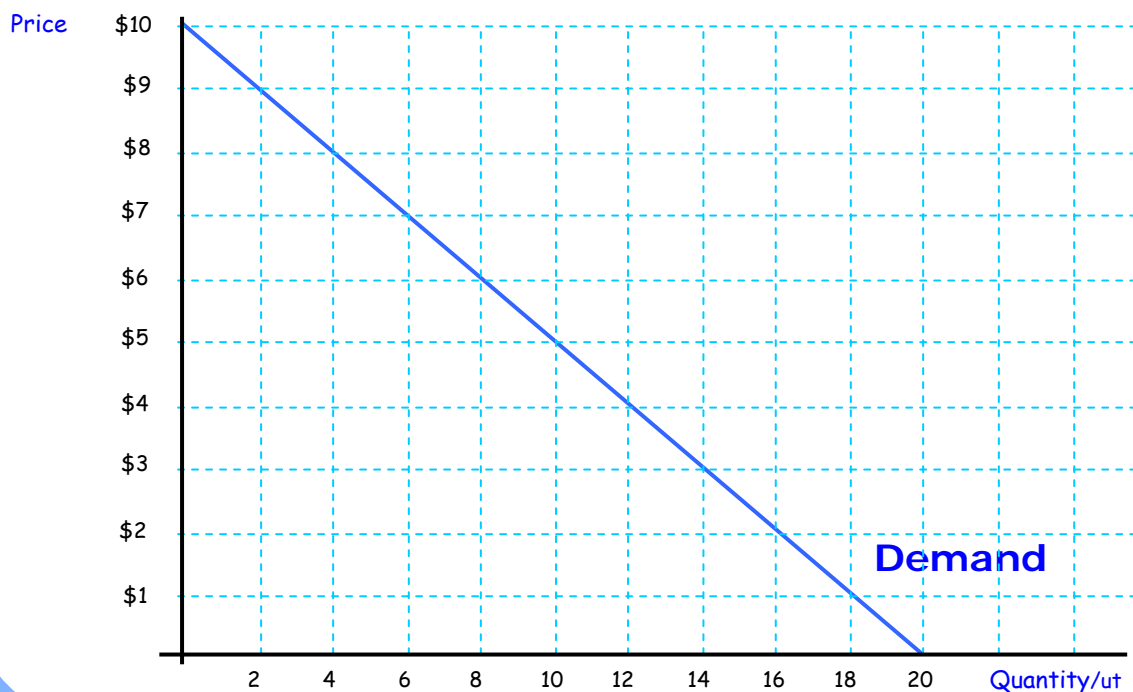


In this example,
 $Q_X = 20 - 2P_X$

P_X	Q_X
\$0	20
\$2	18
\$4	12
\$6	8
\$8	4
\$10	0

Demand “Curve”

- This can be interpreted as, “For every \$1 increase (decrease) in P_X , the quantity purchased (Q_X) will decrease (increase) by 2 units.”
- Note that the demand function has been graphed with P_X on the vertical axis.



In this example,
 $Q_X = 20 - 2P_X$

P_X	Q_X
\$0	20
\$2	18
\$4	12
\$6	8
\$8	4
\$10	0

Market Demand

- The model which represents a summary of the behavioral patterns of all potential buyers in a market can be represented as the horizontal summation of the individual's demand function
- The model can be expressed:

$$Q_X = f_d(P_X, P_R, M, \text{preferences, Number of buyers, } \dots)$$

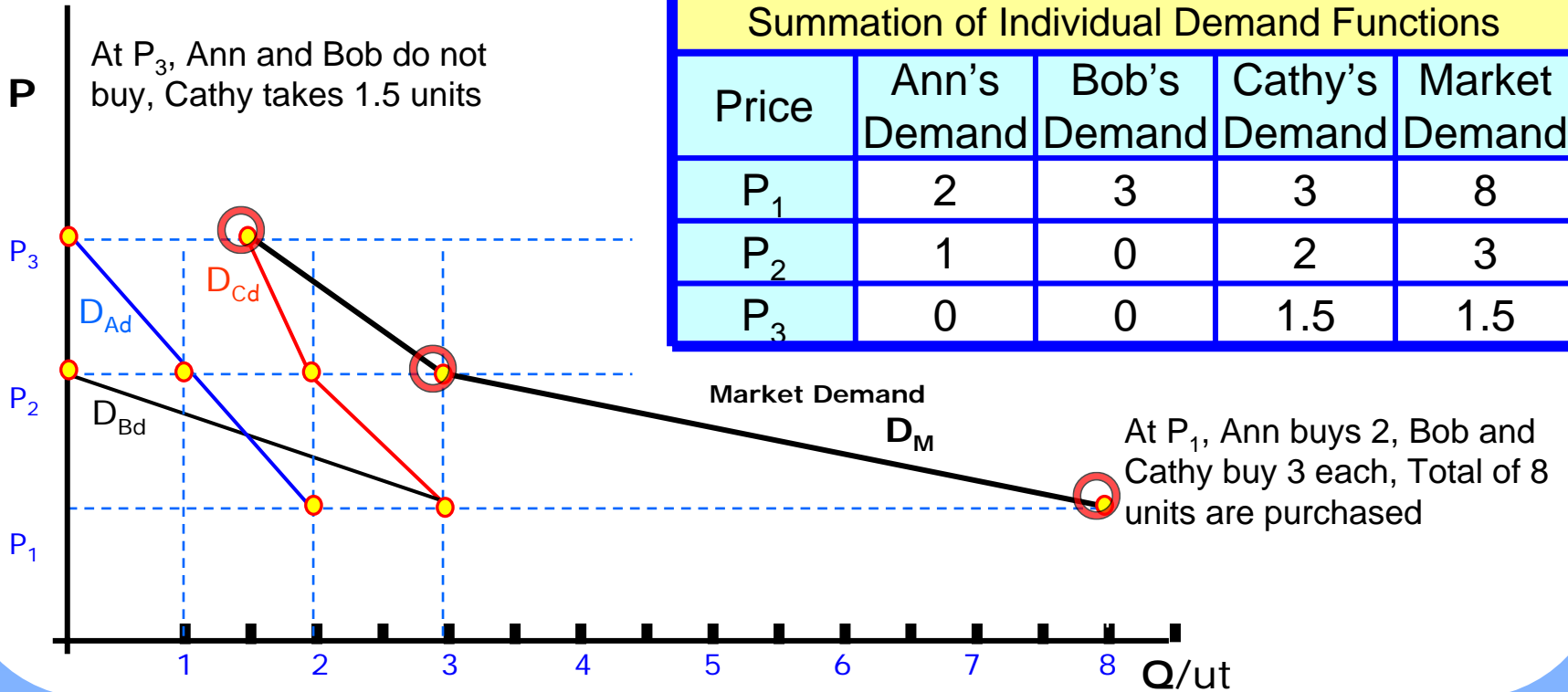
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The market demand Function is the horizontal summation of the individuals' demand functions.

In this example there are only 3 buyers in the market for a good with “nonattenuated” property rights, i.e. the owner of the good has “exclusive property rights.”

Computation of Market Demand By Horizontal Summation of Individual Demand Functions

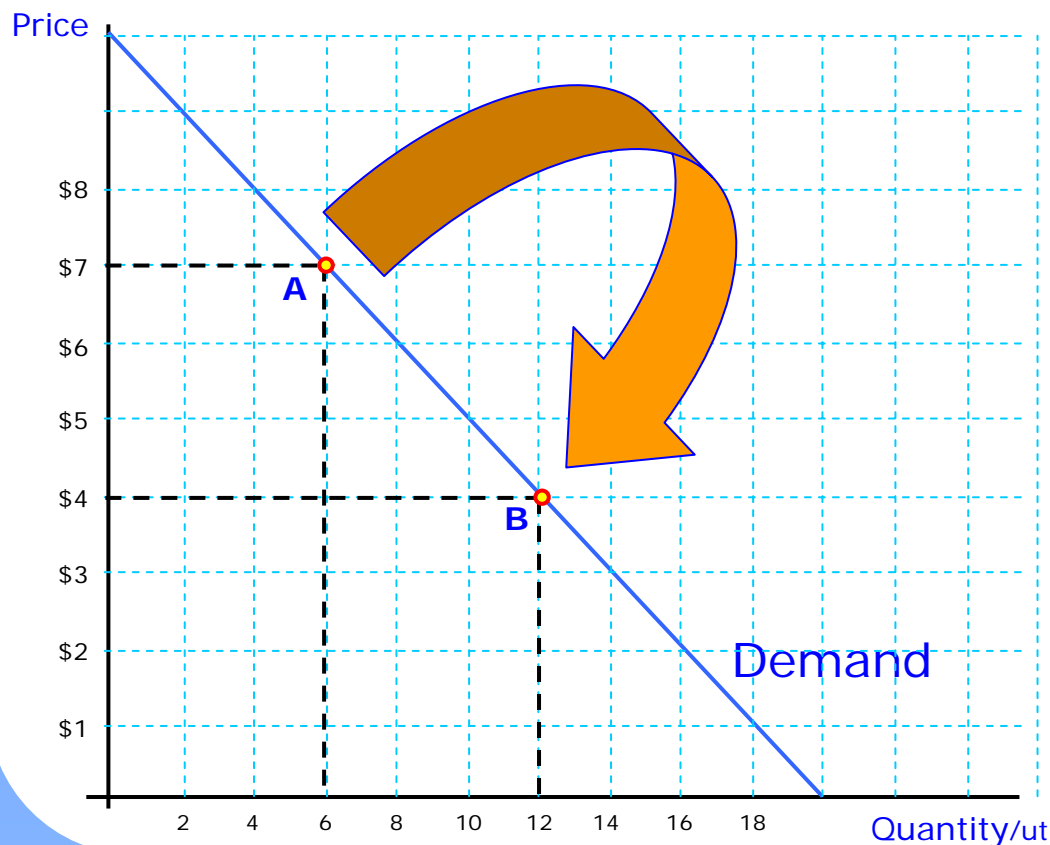
Price	Ann's Demand	Bob's Demand	Cathy's Demand	Market Demand
P_1	2	3	3	8
P_2	1	0	2	3
P_3	0	0	1.5	1.5



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A “**change in quantity demanded**” is a movement along a demand function caused by a change in the price of the good.

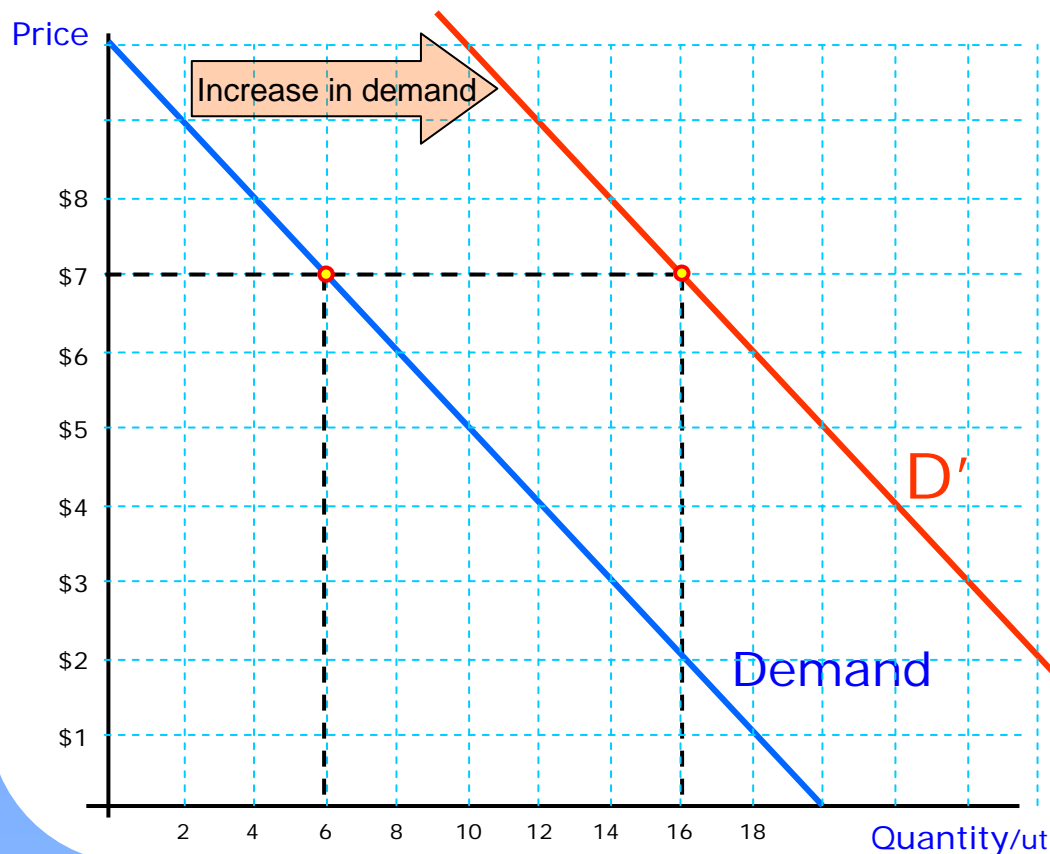
An “increase in quantity demanded” is caused by a decrease in the price of the good. In the graph a decrease in price from \$7 to \$4 results in a movement from point A ($P=\$7$, $Q=6$) to point B ($P'=\$4$, $Q'=12$)



A “decrease in quantity demanded” is caused by an increase in the price of the good. In the graph an increase in price from \$4 to \$7 results in a movement from B ($P'=\$4$, $Q'=12$) point to point A ($P=\$7$, $Q=6$)

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A “**change in demand**” is a “shift” or movement of a demand function caused by a change in one of the ceteris paribus conditions; i.e. a change in income, prices of related goods, preferences, number of buyers or. . . .



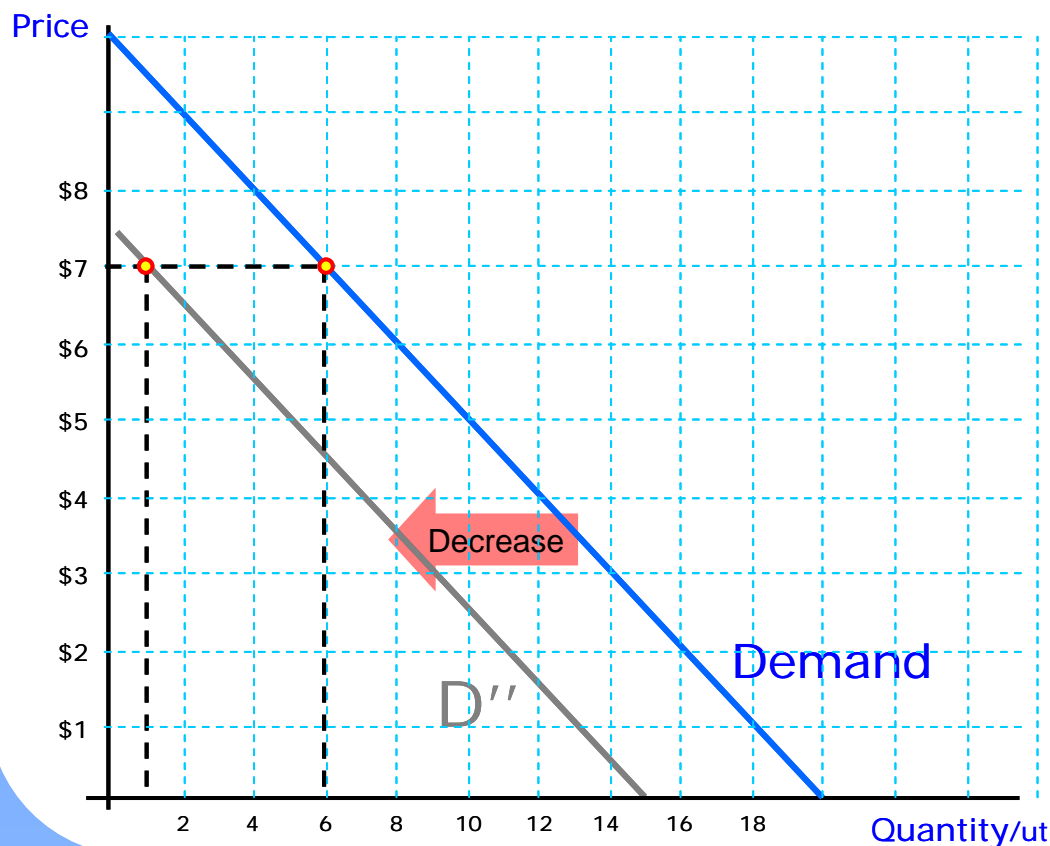
An “**increase in demand**” is a movement or shift of the demand function from “Demand” to D' . More units of the good are purchased at a given price. In this case, at a price of \$7, six units are purchased. Given an increase in demand, 16 units will be purchased at the same price.

An increase in demand for good X can be caused by:

- An increase in income (When X is a normal good)
- A decrease in income (When X is an inferior good)
- An increase in the price of a substitute for good X
- A decrease in the price of a complementary good
- A change in preferences
- An increase in the number of buyers

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A “**decrease in demand**” is a movement or shift of the demand function from “Demand” to D'' . Fewer units of the good are purchased at a given price.



A “**decrease in demand**” is a movement or shift of the demand function from “Demand” to D'' . Fewer units of the good are purchased at a given price. In this case, at a price of \$7, six units are purchased. Given a decrease in demand, 1 unit will be purchased at the same price.

A decrease in demand for good X can be caused by:

- An increase in income (When X is a inferior good)
- A decrease in income (When X is an normal good)
- A decrease in the price of a substitute for good X
- An increase in the price of a complementary good
- A change in preferences
- A decrease in the number of buyers

Supply – “the sellers”

- A supply function represents the behavior of all potential sellers in a market
- The supply function represents a relationship between each possible price of the good and the quantity that will be produced and offered for sale in a given time, *ceteris paribus*.
- Supply functions may represent a single seller or an industry
- The nature of the supply function depends on the production process of the goods, the prices of the inputs and the characteristics of the sellers

Supply

- A formal definition of supply is: “A schedule of quantities that a seller (or sellers) is (are) willing and able to produce and offer for sale at a schedule of prices in a given time period, all other things equal”
 - $Q_{XS} = f_S(P_X)$, *ceteris paribus*
- Supply can also be perceived as the minimum price a seller is willing to accept for every unit of a good in a given time, all other things equal.
 - $P_{XS} = f_S(Q_X)$, *ceteris paribus*
- The supply can be thought of as “opportunity cost” and later it will be developed as “Marginal Cost”

Factors influencing supply

- The behavior of sellers is influenced by many factors:
 - The price of the good
 - The technology of producing that good (later we will call this a “production function”)
 - The prices of the inputs
 - Labour (L) – wage rate (P_L)
 - “K”apital (K) – interest rate (P_K)
 - Land (R) – rent (P_R)
 - The institutional structure
 - Regulations, law, custom/tradition, etc. . . .

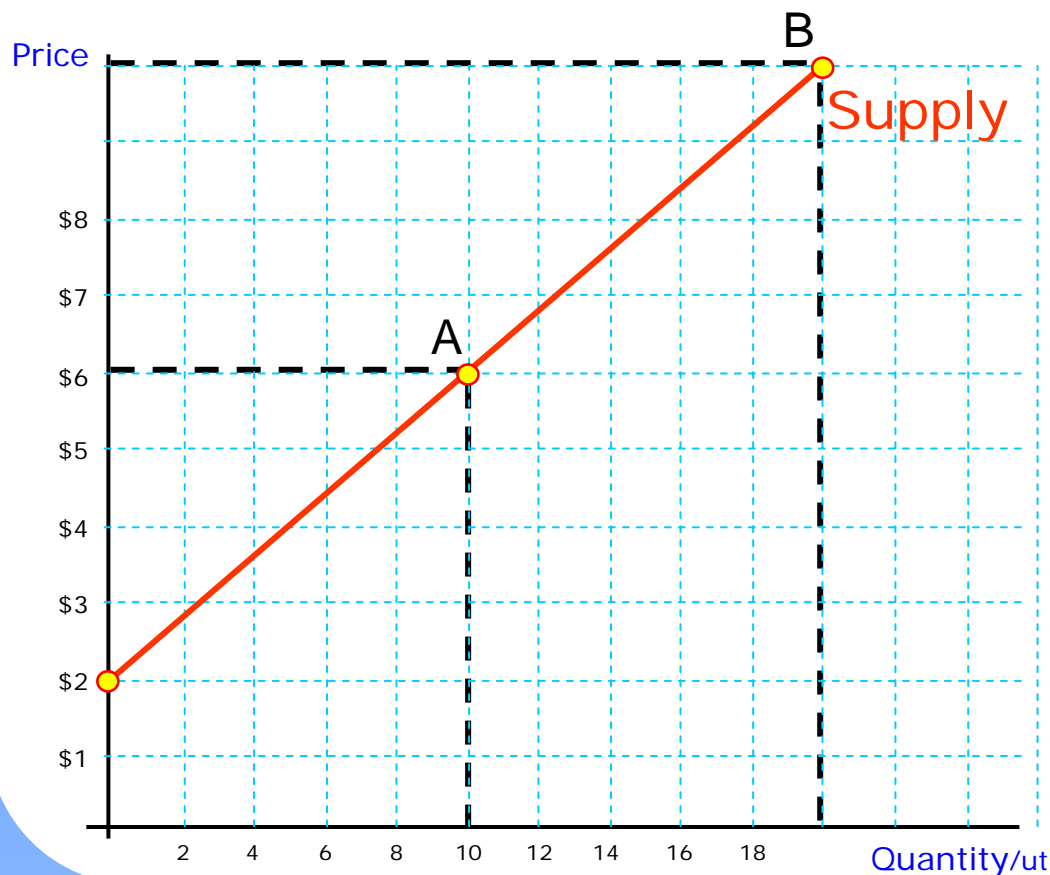
Supply Model

- $Q_{XS} = f_S(P_X, P_{\text{inputs}}, \text{technology, institutions, Number of sellers, } \dots)$
- Where:
 - Q_{XS} = the quantity of good X supplied
 - P_X = the price of good X
 - P_{inputs} = the price of inputs (labour, kapital, land)
 - **Technology** = prescriptive knowledge a recipe (later to be described as a “production function”)
 - **Institutions are the institutional framework and may include:**
 - Laws, regulations, subsidies, taxes (government interaction)
 - Customs, traditions, market structures, geographic features

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If P_{inputs} , technology and institutions do not change, then

$$Q_{XS} = f_S(P_X) \text{ ceteris paribus}$$



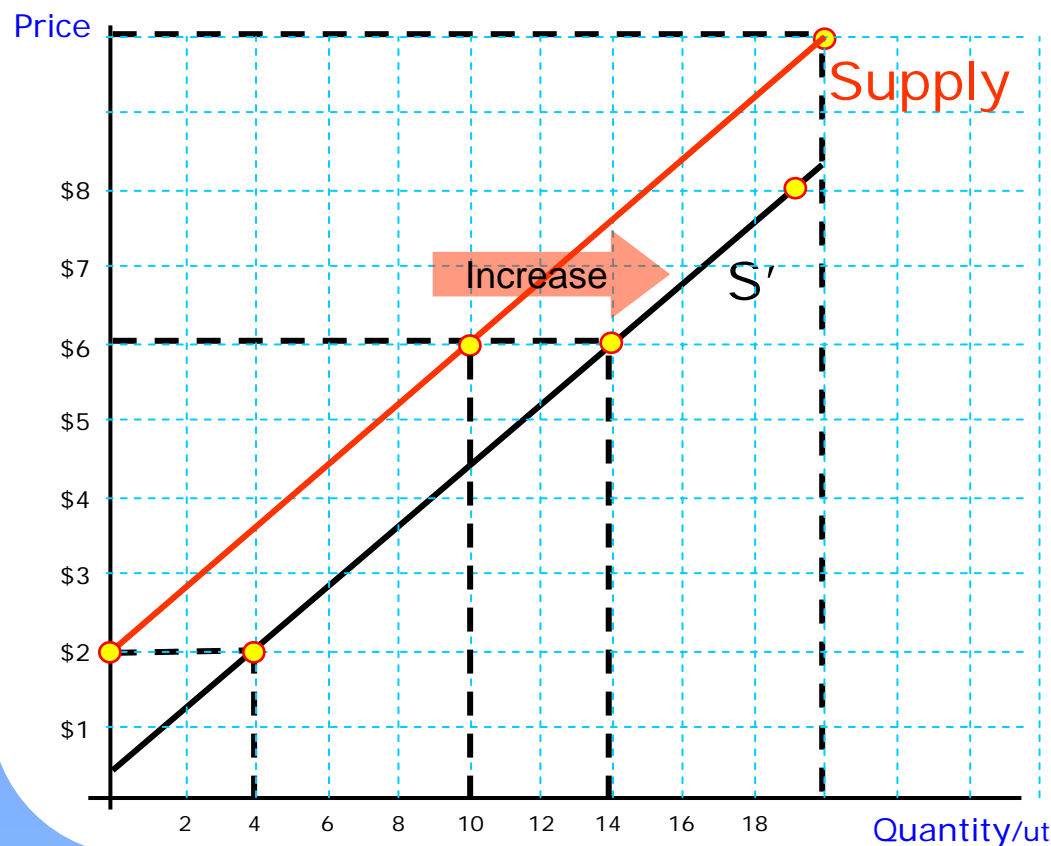
In this example,
 $Q_X = -5 + 2.5P_X$

P_X	Q_{XS}
\$2	0
\$4	5
\$6	10
\$8	15
\$10	20

A change in quantity supplied can be visualized as a movement along the supply function (from A to B) caused by a change in the price of the good.

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An “increase in supply” means that at each price a larger quantity will be produced and offered for sale.



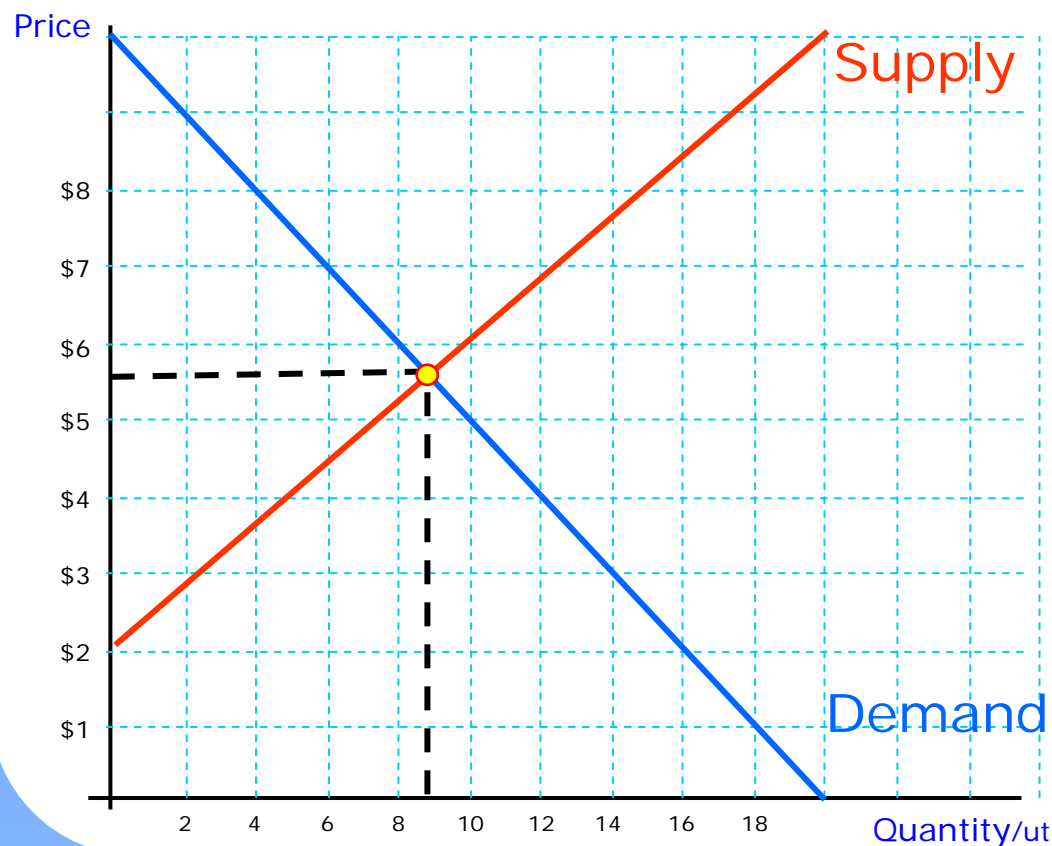
A decrease in the prices of inputs, improvement in technology or a change in institutional structure can shift the supply to the right; at each price a larger quantity is offered for sale.

P_x	Q_{xS}	Q_{xS}'
\$2	0	4
\$4	5	9
\$6	10	14
\$8	15	19
\$10	20	

A decrease in supply is represented by a shift of the supply function to the left.

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Equilibrium in a market is where the “quantity demanded” is equal to the “quantity supplied,” i.e. the intersection of the demand and supply functions.



$$Q_x = 20 - 2P_x$$

$$Q_{xS} = -5 + 2.5P_x$$

$$20 - 2P_x = -5 + 2.5P_x$$

$$4.5P_x = 25$$

$$P_x = \frac{25}{4.5} = 5.56 \text{ or } \$5.56$$

The equilibrium price is \$5.56

By substitution:

$$Q_x = 20 - 2(5.56)$$

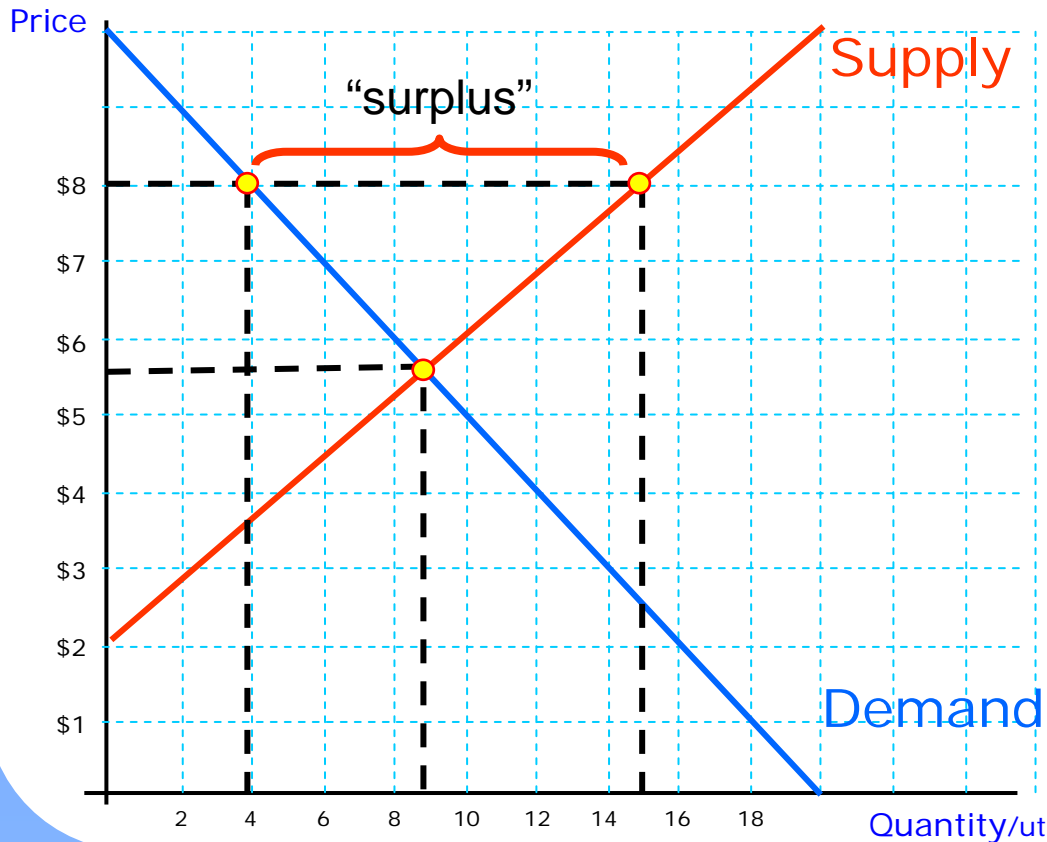
$$Q_x = 8.88 \text{ units}$$

The equilibrium quantity is 8.88 units.

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Equilibrium in a market is where the “quantity demanded” is equal to the “quantity supplied,” i.e. the intersection of the demand and supply functions.

If the market price were greater than the equilibrium price:



The quantity supplied exceeds the quantity demanded, there is a “surplus.”

As a result, the sellers will offer the surplus at a lower price.

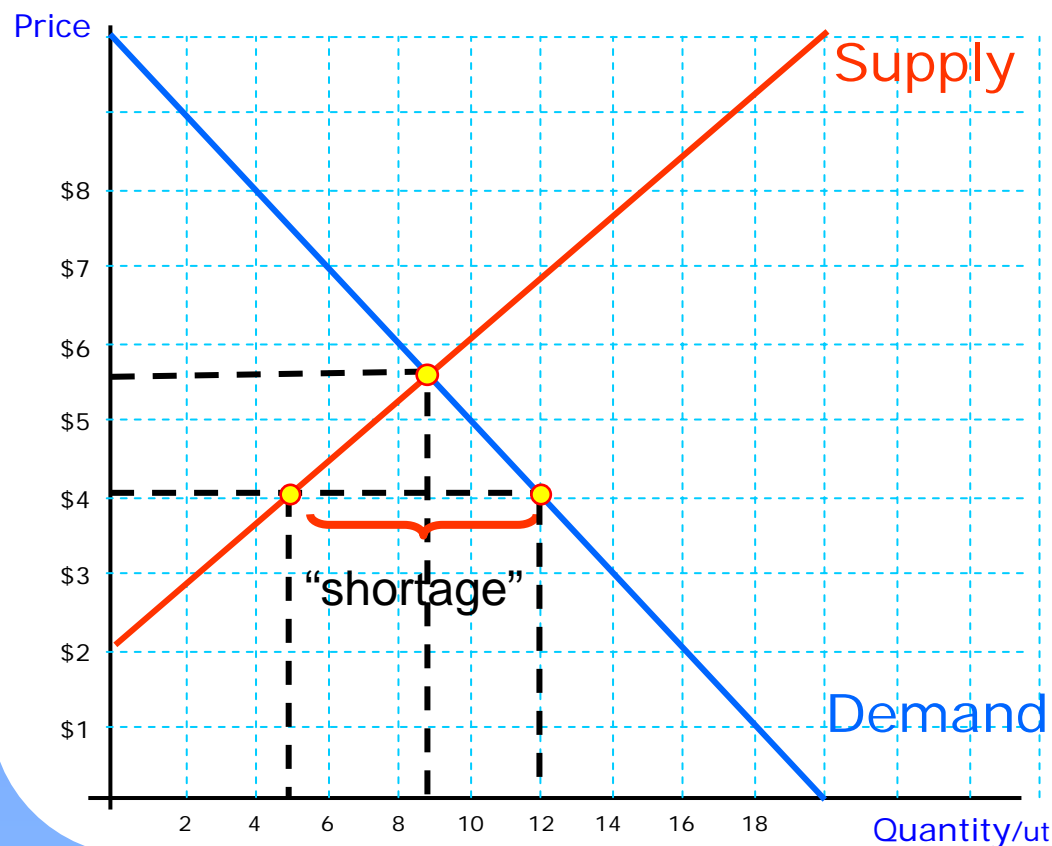
The quantity supplied will fall and the quantity demanded will rise.

The market price moves toward equilibrium price.

Chapter 8 – Demand and Supply in a Market System

Equilibrium in a market is where the “quantity demanded” is equal to the “quantity supplied,” i.e. the intersection of the demand and supply functions.

If the market price were less than the equilibrium price:



The quantity demanded exceeds
The quantity supplied,
There is a “shortage.”

As a result, the buyers will offer
a higher price to get what they
want.

The quantity supplied will rise,
and
the quantity demanded will fall.

The market price moves toward
equilibrium price.

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The behavioral patterns of the buyers and sellers is coordinated by market forces.

The quantity offered for sale at the “equilibrium market price” is equal to the quantity that buyers want to purchase at that price.

This is a simplistic model that assumes both price and quantity can be adjusted within a given time frame. More complicated models can be used to show price adjustments where price and/or quantity are adjusted over several time periods.

When exchange is voluntary and the property rights to the good is nonattenuated, and the quantity supplied is equal to the quantity demanded, the welfare of the buyers and sellers is optimized.