Demand & Supply
(A Simple but Important Economic Model)

School of Business, Nanjing University

Zhen-Hua Wu

Demand:

First, we need to determine the demand for the **product** that is sold in that market.
(A manufactured good, a raw material, or a service.)

Demand Curve:

A curve shows how much buyers of the product want to buy at each possible price, holding fixed all other factors that affect demand.

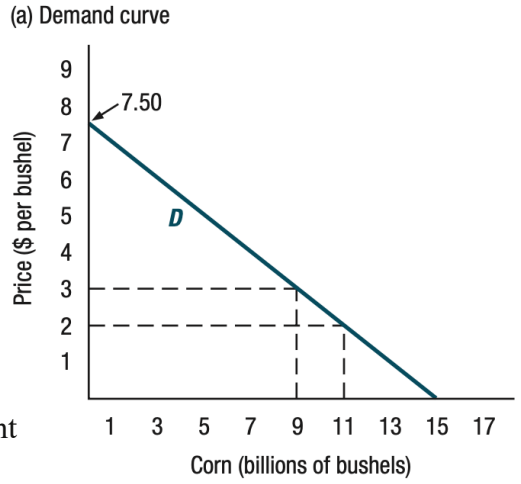
The Demand Curve for Corn. Figure (a) shows the demand curve for corn, which depicts the amount of corn consumers and firms want to buy at each possible price, holding fixed all other factors that affect demand. Figure (b) shows how the demand for corn increases when the price of potatoes rises, shifting the demand curve to the right.

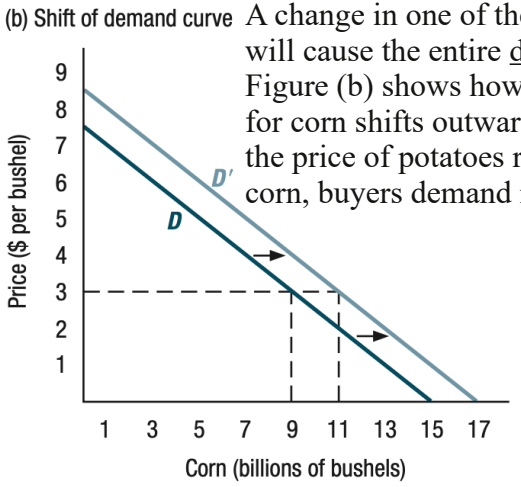
Downward sloping: higher price, less purchase (**Law of Demand**)

Almost all demand curves slope downward.

Intuitively, when the price is higher, buying a product is less attractive than when the price is lower. Then, some potential purchasers will decide to spend their money on other products.

Other facts can affect the demand for a product: population growth, consumer tastes (***Preference***) and incomes, the prices of other products, and government taxes or regulations.





A change in one of these **other factors** will cause the entire <u>demand</u> curve to shift. Figure (b) shows how the demand curve for corn shifts outward (to the right) when the price of potatoes rises. At each price of corn, buyers demand more.

EX: Consider the demand for corn. If a popular diet recommends a low intake of carbohydrates, consumers' desire for corn will decrease, and they will purchase less at any given price. If instead, vegetarianism becomes more popular, consumers' desire for corn will increase, and they will purchase more at any given price.

Two products are **substitutes** if, all else equal, an increase in the price of one of the products causes buyers to demand more of the other product.
(potato & corn)

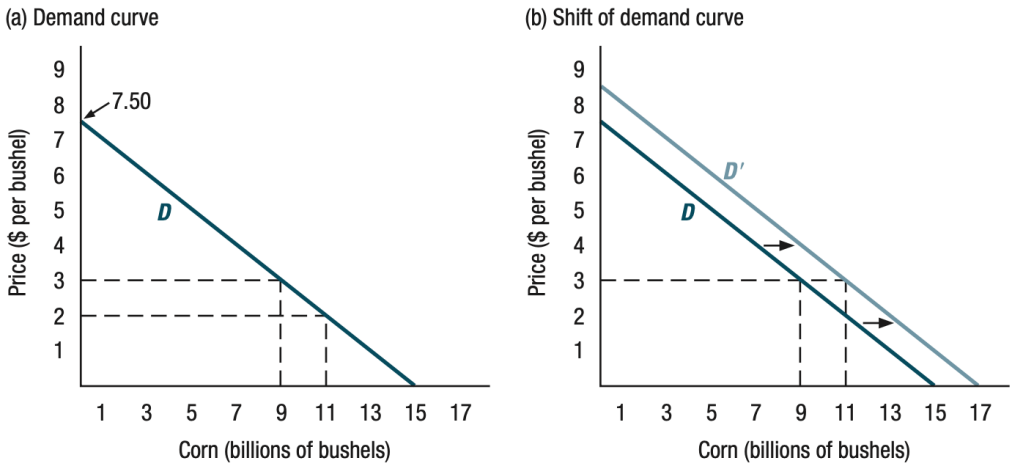
Two products are **complements** if, all else equal, an increase in the price of one of the products causes consumers to demand less of the other product.
(butter & corn)

Demand:

Movements Along versus Shifts of the Demand Curve

A change in the price of a product causes a ***movement along*** its demand curve, resulting in a change in the quantity (or amount) demanded. A change in some other factor (such as consumer tastes or income, or the prices of other products) causes a ***shift*** of the entire demand curve, known as a change in demand.

The Demand Curve for Corn. Figure (a) shows the demand curve for corn, which depicts the amount of corn consumers and firms want to buy at each possible price, holding fixed all other factors that affect demand. Figure (b) shows how the demand for corn increases when the price of potatoes rises, shifting the demand curve to the right.



Demand Function:

A product's ***demand function*** describes the amount of the product that is demanded for each possible combination of its price and other factors.

$$Q^d = \mathrm{D}(P, \text{other facts})$$

EX: $Q^d_{corn} = 5 - 2P_{corn} + 4P_{potatoes} - 0.25P_{butter} + 0.0003M$ (1)

Here, we use M to denote the income, $P\ldots$ are prices

EX: when potatoes cost \$0.50 per pound, butter costs \$4 per pound, and consumers' average annual income is \$30,000, we have $Q^d = 15 - 2P \rightarrow$ (a)

When the price of potato increases from \$0.50 to \$1 per pound, the demand curve changes to $Q^d = 17 - 2P \rightarrow$ (b)

The Problem: Suppose that the demand function for corn takes the form in formula (1), that potatoes cost \$0.50 per pound, that butter costs \$4 per pound, and that consumers' average annual income is \$30,000.
At what price of corn will consumers demand 8 billion bushels per year? How does your answer change if the price of potatoes rises from \$0.50 to \$1 per pound?

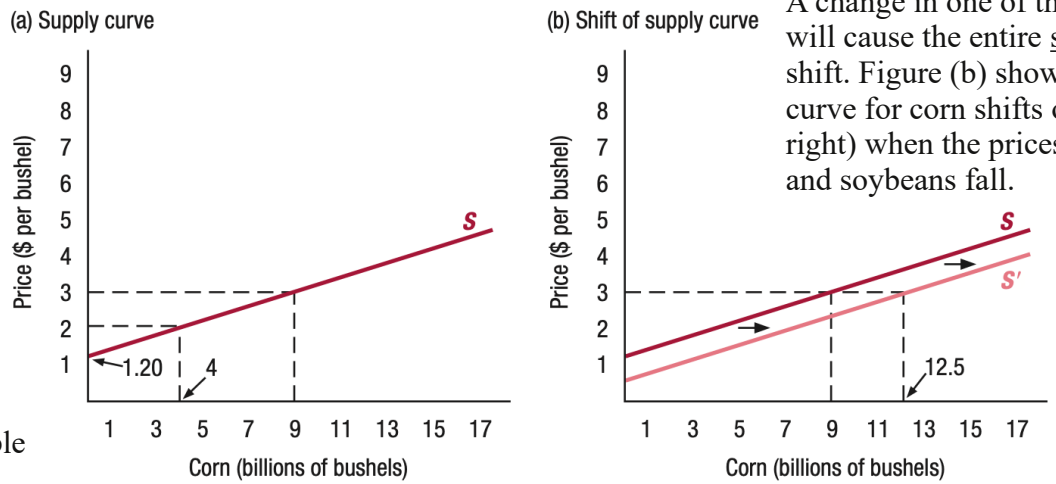
Supply:

Second, we need to determine the supply of a product in that market.

Supply Curve:

A curve shows how much sellers of the product want to sell at each possible price, holding fixed all other factors that affect supply.

The Supply Curve for Corn. Figure (a) shows the supply curve for corn, which depicts the amount of corn farmers want to produce and sell at each possible price, holding fixed all other factors that affect supply. Figure (b) shows how the supply of corn increases when the prices of diesel fuel and soybeans fall, shifting the supply curve to the right.



Upward sloping: higher price, more selling (quantity) (**Law of Supply**)

Almost all supply curves slope upward.

Intuitively, when the price is higher, producing and selling corn is more profitable, and farmers will plant more of their land with corn rather than other crops, such as wheat.

Other facts can affect the supply for a product: technology, the prices of inputs, the prices of other possible outputs, and government taxes or regulations.

A change in one of these **other factors** will cause the entire supply curve to shift. Figure (b) shows how the supply curve for corn shifts outward (to the right) when the prices of diesel fuel and soybeans fall.

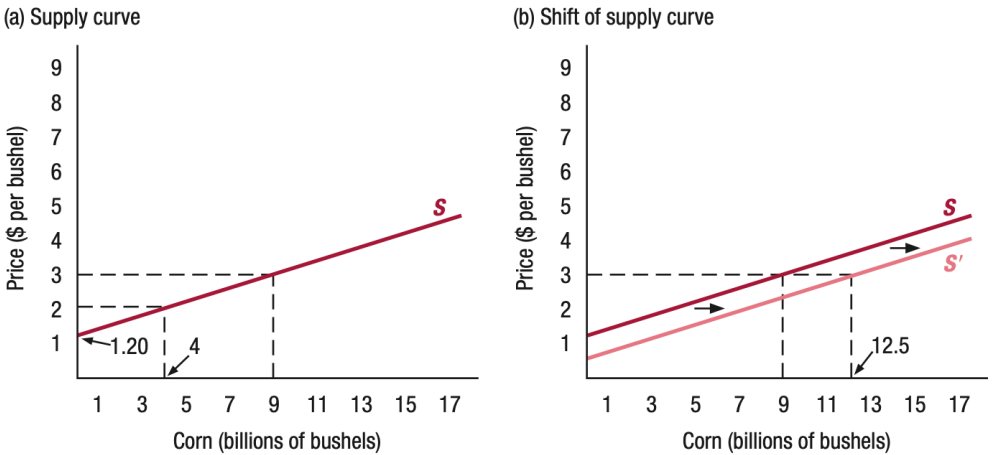
EX: reductions in the price of fertilizer or diesel fuel lower the cost of production, making corn more attractive to produce and sell at any given price. On the other hand, increases in the price of other crops that farmers can plant instead of corn, such as soybeans, lower the amount of corn farmers will supply at any given price of corn.

Supply:

Movements Along versus Shifts of the Supply Curve

A change in the price of a product causes a ***movement along*** its supply curve, resulting in a change in the quantity (or amount) supplied. A change in some other factor, e.g., technology or input prices, causes a ***shift*** of the entire supply curve, known as a change in supply.

The Supply Curve for Corn. Figure (a) shows the supply curve for corn, which depicts the amount of corn farmers want to produce and sell at each possible price, holding fixed all other factors that affect supply. Figure (b) shows how the supply of corn increases when the prices of diesel fuel and soybeans fall, shifting the supply curve to the right.



Supply Function:

A product's ***supply function*** describes the amount of the product that is supplied for each possible combination of its price and other factors..

$$Q^s = \mathrm{S}(P, \text{other facts})$$

EX: $Q^s_{corn} = 9 + 5P_{corn} - 2P_{fuel} - 1.25P_{soybeans}$ (2)

Here, P… are prices

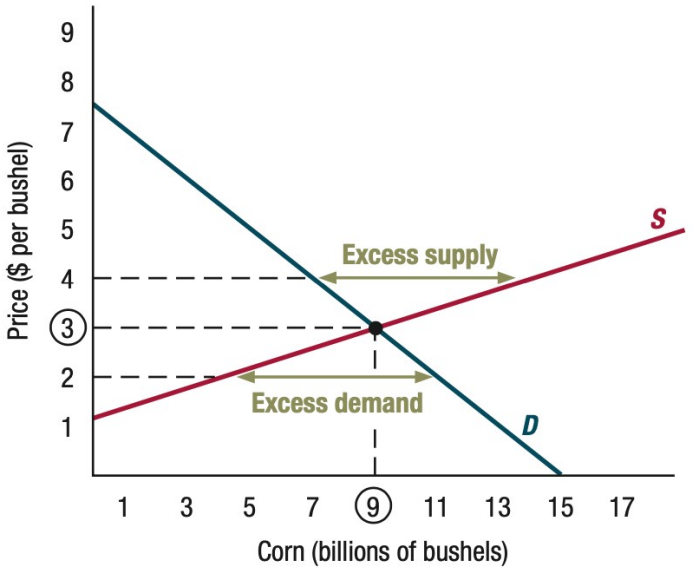
EX: When diesel costs \$2.50 a gallon, and soybeans sell for \$8 a bushel
We have $Q^s = 5\mathrm{P} - 6$ → (a)

When a fall in the price of diesel fuel from \$2.50 to \$2 per gallon, combined with a fall in the price of soybeans from \$8 to \$6 per bushel $Q^s = 5\mathrm{P} - 2.5$ → (b)

Economists determine both the demand and supply function for a product by applying statistical techniques to historical data.

Market Equilibrium:

Once we know the demand and supply for a product, the next step is to determine the ***equilibrium price***: the price at which the amounts supplied and demanded are equal.



Market prices tend to adjust so that the amount supplied equals the amount demanded.

Suppose that the price of corn is $2 per bushel. According to Figure on the left, there is excess demand; the amount demanded exceeds the amount supplied.
In that case, some buyers won't be able to purchase as much of the product as they would like at the prevailing price. They have incentives to offer a slightly higher price to acquire their desired amounts. These offers will push the market price upward, reducing buyers' demands and increasing sellers' supply until supply and demand are once more in balance.

If instead the price of corn is $4 per bushel, there is excess supply: the amount supplied exceeds the amount demanded. (See Figure on the left.) In that case, some sellers won't be able to sell as much as they would like at the prevailing price. They'll have an incentive to lower their prices a little to boost sales. These price reductions will push the market price downward, increasing buyers' demands and reducing sellers' supply until supply and demand are once more in balance.

When the price is such that the amounts supplied and demanded are equal, there is neither excess supply nor excess demand. Since everyone can buy or sell as much as they like at that price, there is no pressure for the market price to rise or fall (**equilibrium**).

Example:

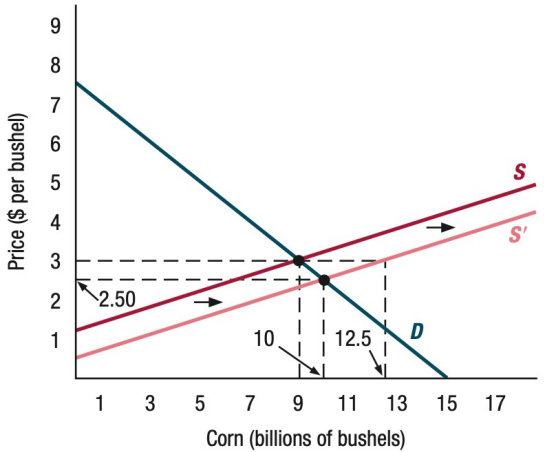
Excess S: minimal wage; minimal price for wheat, gas price in China…, supply chain in COVID-19
Excess D (**shortage**): lots of examples in soviet union → black market, discrimination
Many other cases with price control by government

The Problem: Suppose that the demand function for corn is $Q^d = 15 - 2P$ and the supply function is $Q^s = 5P - 6$.
What is the equilibrium price of corn? What is the amount bought and sold?

Market Equilibrium:

Change in Market Equilibrium:

Market conditions often change. Supply or demand can increase or decrease. What effect will this have on the market price and amount bought and sold? Economists are often called upon to predict such changes, a type of analysis that is called ***comparative statics***.



A Change in Market Equilibrium:

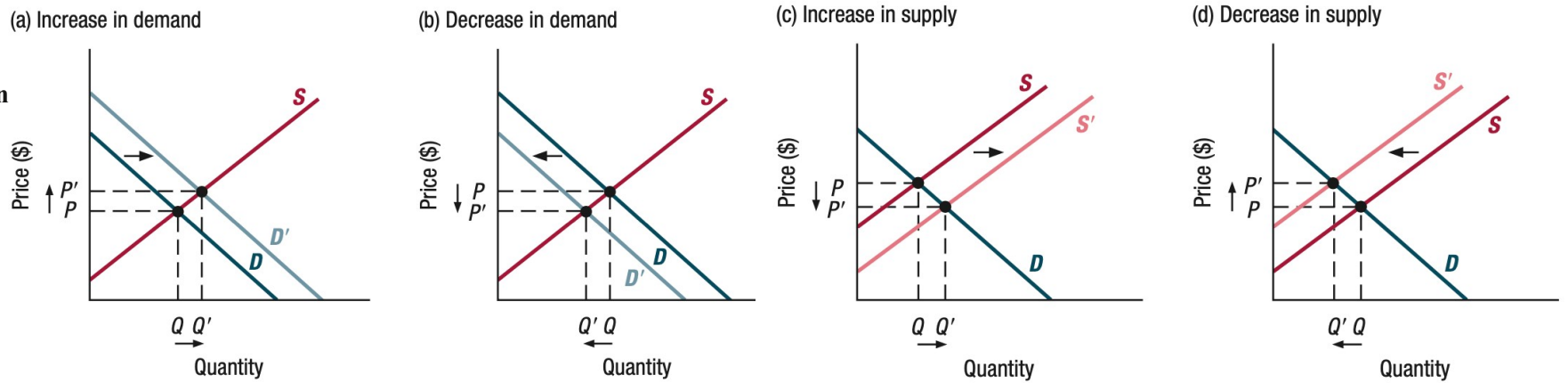
When the price of diesel fuel falls from $2.50 to $2 per gallon and the price of soybeans falls from $8 to $6 per bushel, the supply of corn increases, shifting the supply curve to the right.

At the original price of $3 per bushel, there is an excess supply of corn: farmers want to sell 12.5 billion bushels but consumers and firms want to buy only 9 billion bushels. This imbalance puts downward pressure on the market price.

The equilibrium price falls to $2.50, and the amount bought and sold increases to 10 billion bushels per year.

The Effects of Shifts in Demand or Supply on Market Equilibrium.

The right four figures show the effects of various shifts in either demand or supply on price and the amount bought and sold.

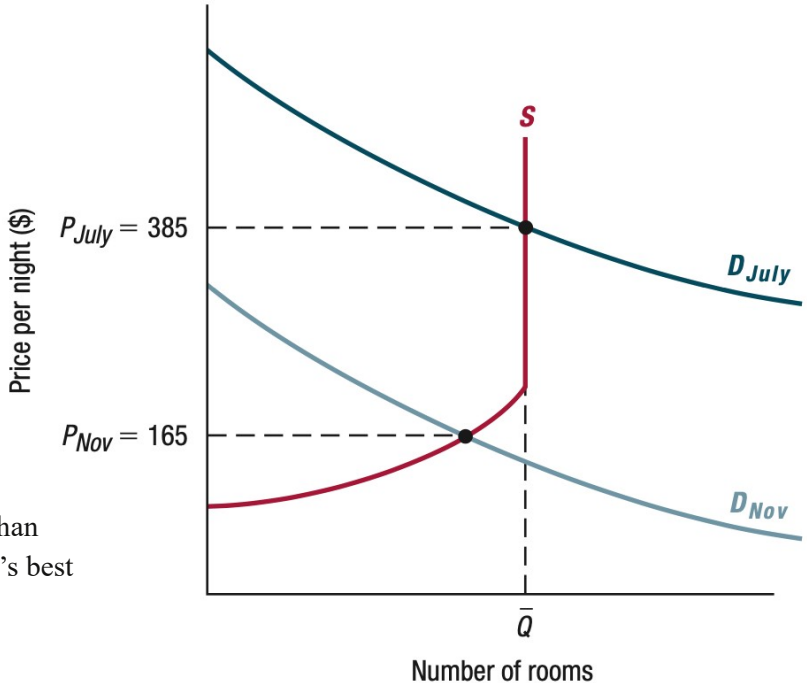


Market Equilibrium:

EX: Market Equilibrium in Hotel Market:

The elegant Bar Harbor Inn overlooks beautiful Frenchman's Bay in Bar Harbor, Maine, just minutes from Acadia National Park. At the height of the summer tourist season, the inn's most expensive rooms cost over $350 per night. Unfortunately, those same tourists have little interest in visiting once the leaves have fallen from the trees. By then, they're thinking of Caribbean beaches or the ski slopes in Colorado and Utah.

As a result, the price of hotel rooms at Bar Harbor's many inns, which together make up the supply in this market, vary greatly by season. As Figure on the right shows, the supply curve for hotel rooms in Bar Harbor is the same in November as in July. The quantity $\overline{Q}$ is the total number of rooms. At high prices, inn owners want to rent all those rooms, but at low prices, they withdraw some rooms from the supply, since the price no longer compensates them for the expense and effort of serving customers. (In the dead of winter, some inn owners close temporarily and take a vacation.)



The demand in the two months is very different, so that the price in November (P_{Nov}) is much lower than the price in July (P_{July}). In 2012, for example, a tourist paid $385 a night to stay in the Bar Harbor Inn's best room during July, but only $165 a night to stay in the same room during November.

The Problem: Think about a market with interesting demand or supply curve(s).

Market Equilibrium:

The Effects of an Increase in Both Demand and Supply:

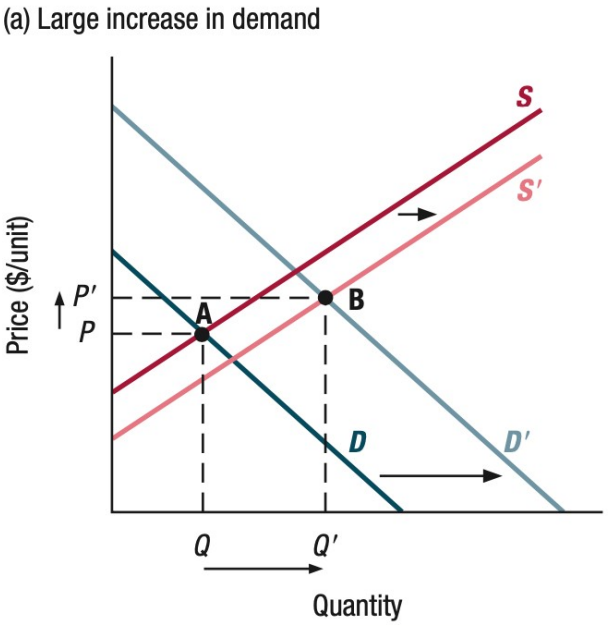
We have seen that when both demand and supply increase, the amount bought and sold necessarily increases, but the effect on price is ambiguous.

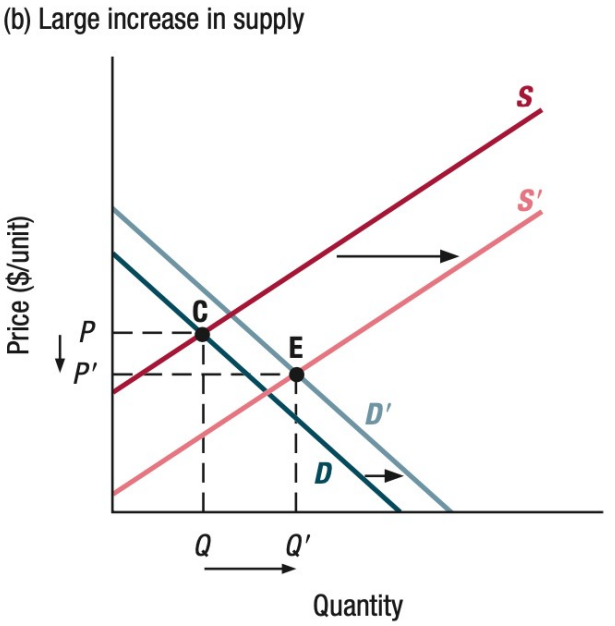
Figure (a) shows that when demand increases a lot but supply increases only a little, the price rises.

Figure (b) shows that when supply increases a lot but demand increases only a little, the price falls.

In general, when separate shifts in demand and supply each individually move the price in the same direction, the equilibrium price will definitely move in that direction.

When separate shifts in supply and demand move the price in opposite directions, the equilibrium price can move in either direction, depending on the relative sizes of the changes. This principle applies as well to effects on the amount bought and sold.





Effects of Simultaneous Changes in Demand and Supply

Source of Change	Effect on Price	Effect on Amount Bought/Sold
Demand increases/supply increases	Ambiguous	Rises
Demand decreases/supply decreases	Ambiguous	Falls
Demand increases/supply decreases	Rises	Ambiguous
Demand decreases/supply increases	Falls	Ambiguous

Market Equilibrium:

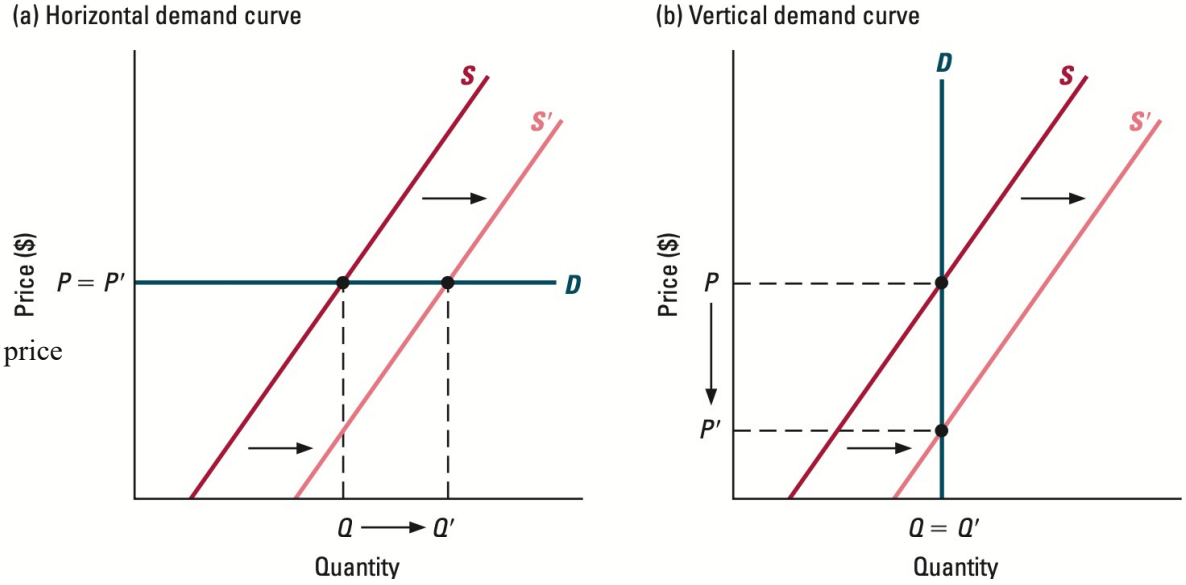
The Size of Changes in Market Equilibrium:

Now, we try to understand, when demand & supply shift: How much the price or amount bought and sold will change? **What factors determine the size of the price change**?

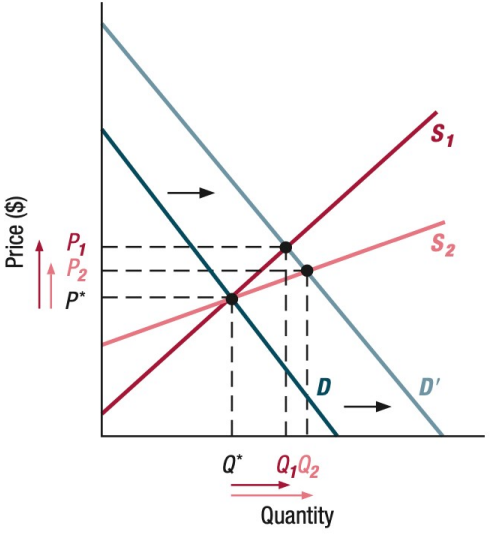
Two Extreme Demand Curves: (right)

Figure (a) shows that when the demand curve is perfectly horizontal, an increase in supply has no effect on the product's price but increases the amount bought and sold.

Figure (b) shows that when the demand curve is perfectly vertical, an increase in supply has no effect on the amount bought and sold but decreases the product's price.



Steepness (slope): reflects the responsiveness of buyers' demands to the price



The left figure show a general case, where two supply curves differ in how responsive supply is to price change.

Both supply curves intersect the initial dark blue demand curve D at the same initial price and quantity, P* and Q*. However, supply curve S_1 is steeper than supply curve S_2, so the quantity supplied is more responsive to increases in price with curve S_2 than with curve S_1. (**Elasticity**)

When demand increases to D', the price increases more and the amount bought and sold increases less with the less responsive supply curve S_1 (with supply curve S_1 the price increases to P_1, and the amount bought and sold increases to Q_1, but with supply curve S_2 they instead increase to P_2 and Q_2).

Market Equilibrium:

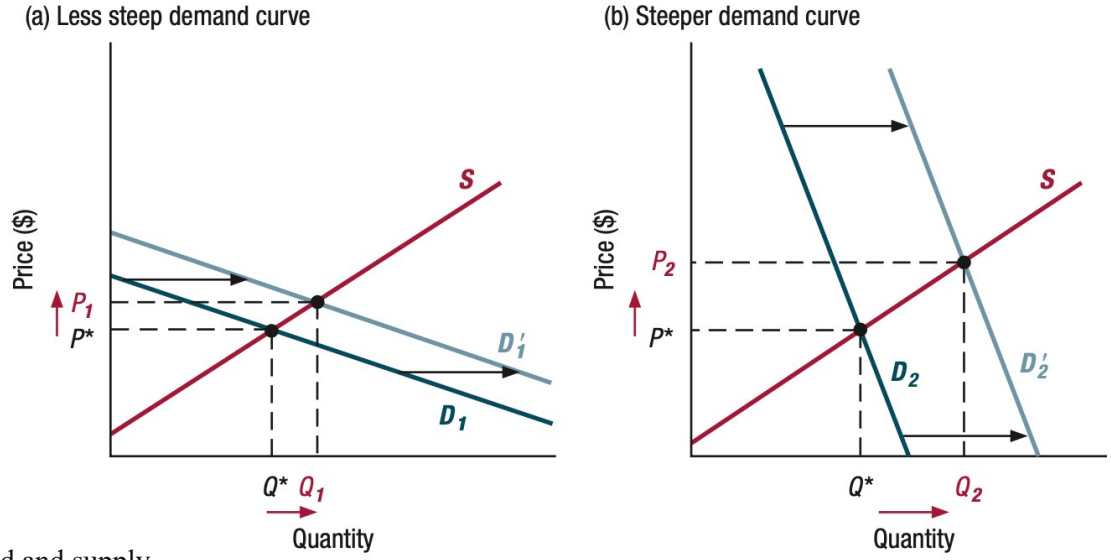
The Size of Changes in Market Equilibrium: (Continued)

The right figure shows how the steepness of the demand curve matters when the demand curve shifts.

The initial dark blue demand curves in Figure (a) and (b) both intersect the supply curve S at the same initial price and quantity P* and Q*.

In each case demand increases to the light blue curve, shifting the demand curve to the right by the same fixed amount at every price. We can see that price and quantity both increase more with the steeper demand curve in Figure (b).

The less responsive supply and demand are to price changes, the more the price will change when demand increases.



Intuitively, when demand increases, the price must change to rebalance demand and supply. If demand and supply are very responsive to price, not much of a price change is needed to accomplish this, whereas if they are not very responsive, a large price change is required.

Proposition: Changes in Market Equilibrium and the Price Responsiveness of Demand and Supply

1. When the demand curve shifts: the steeper the supply curve (the less responsive the amount supplied is to price), the larger the price change and the smaller the change in the equilibrium quantity.

2. When the supply curve shifts: the steeper the demand curve (the less responsive the amount demanded is to price), the larger the price change and the smaller the change in the equilibrium quantity.

   Proof: In class.

Market Equilibrium:

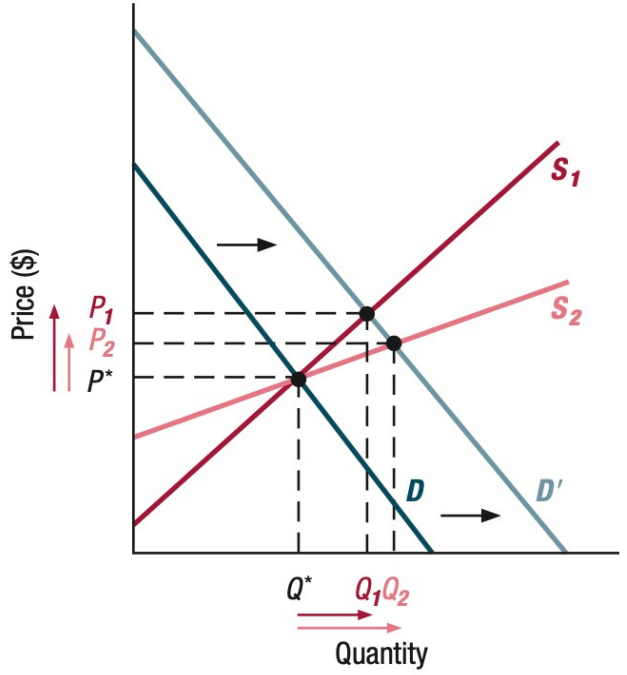
Short-Run and Long-Run Changes in Market Equilibrium

The responsiveness of a product's demand or supply to its price, and therefore the slopes of supply and demand curves, can depend on the time horizon.

For example, once farmers plant their fields, they may be unable to produce much more corn in the short run due to the limitation of technology, if the price of corn rises. But in the long run they can plant more of their land with corn and even acquire additional land or some advanced technologies.

Suppose the corn market is in equilibrium at price P* in the right Figure, and the demand curve suddenly shifts from D to D'. Let the steeper supply curve, S_1, represent the short-run supply curve, while the flatter one, S_2, represents the long-run supply curve. Then, as the figure shows, the price will rise sharply to P_1 in response to the increase in demand, but over time it will fall back toward its original level, eventually reaching P_2 in long-run equilibrium. The amount bought and sold, will increase only to Q_1 at first, but will continue to increase over time, eventually reaching Q_2 in long-run equilibrium.

Many markets share the similar feature, e.g., mask in COVID-19, housing ...



Elasticities of Demand & Supply:

How to measure responsiveness of a product's demand or supply to changes in price?

- Steepness (or slope) of the demand and supply curves

  However, it is affected by the units

  EX:

  If someone says that the demand curve for milk has a slope of 200, what does that mean? It might mean that when the price of milk rises by a penny per quart, 200 fewer quarts are sold. But it might instead mean that when the price of milk rises by a dollar per gallon, 200 fewer gallons are sold. To know which it is, we would have to be careful to specify exactly how we are measuring both the units of the good and the price.

  Worse yet, suppose we wanted to know whether the demand for gasoline in the U.S. is more responsive to price than the demand for potatoes. If an increase of $0.25 per gallon increases gasoline demand by 5 million gallons per day, and an increase of $0.25 per pound increases potato demand by 8,000 tons per day, which is more responsive to price?

- Economists introduce the concept of ***elasticity***:

  In general, it measuring the responsiveness of one variable to changes in another variable.

  Usually, we define the elasticity of Y with respect to X as: $E_X^Y = \frac{\%\text{change in } Y}{\%\text{change in } X}$

  Elasticities are "unit-free measures": if someone tells you the elasticity of demand for a good with respect to some variable X, you can understand what it means without knowing the units in which they were measuring the quantity demanded and the variable X. And using elasticities, we can also make meaningful comparisons across goods.

  For both positive and negative elasticities, values that are further from zero indicate greater responsiveness.

  EX: Suppose that initially a 2 percent increase in X causes Y to fall by 4 percent, but due to some new development, Y becomes more responsive to X—a 2 percent increase in X now causes Y to fall by 6 percent. Then the elasticity of Y with respect to X would change from -2 to -3. The new elasticity is further from zero, we would say that Y has become **more elastic** with respect to changes in X.

Elasticities of Demand & Supply:

The (Price) Elasticity of Demand

It equals the percentage change in the quantity demanded divided by the percentage change in the price, or, the percentage change in the quantity demanded for each 1 percent increase in the price.

- The quantity demanded typically decreases when the price increases, so we expect the elasticity of demand to be negative.
- Products tend to have more elastic demands when they have closer substitutes to which consumers can switch in response to a price increase.
  - Demand will be more elastic when the potential buyers of the product regard it as a discretionary purchase, rather than as a necessity.
- If the potential buyers are all wealthy and pay little attention to their expenditures, the demand will be less elastic than if the they are poor.

In general, the elasticity of demand can differ at different points on the demand curve.

Economists usually measure the elasticity of demand separately at each possible initial price. To do this, they also focus on the responsiveness of demand to small price changes so that they are getting a measure of responsiveness close to the initial price. Then we define:

$$E^d = \frac{\%\text{change in quantity of demanded}}{\%\text{change in price}} = \frac{\Delta Q/Q}{\Delta P/P}$$

where $\Delta Q = Q' - Q$ and $\Delta P = P' - P$.

We can re-express above express as: $E^d = \left(\frac{1}{(\Delta P/\Delta Q)}\right)(P/Q)$

- For a linear demand curve, ΔP/ΔQ is exactly the demand curve's slope.

Elasticities of Demand & Supply:

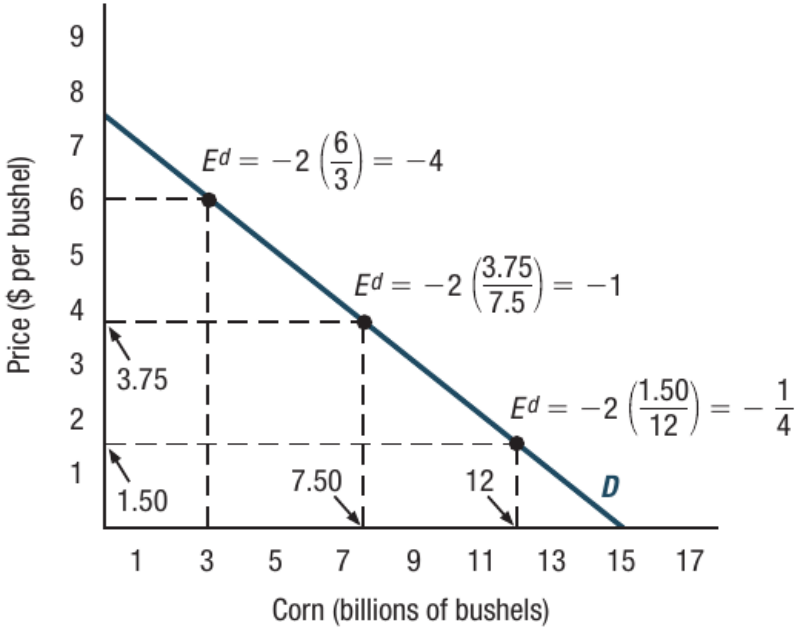
The (Price) Elasticity of Demand

Linear Demand

Let the linear demand function be $Q^d = A - BP$, where $A, B > 0$, it is easy to calculate that $E^d = -B(P/Q)$. [Check it by yourself!]

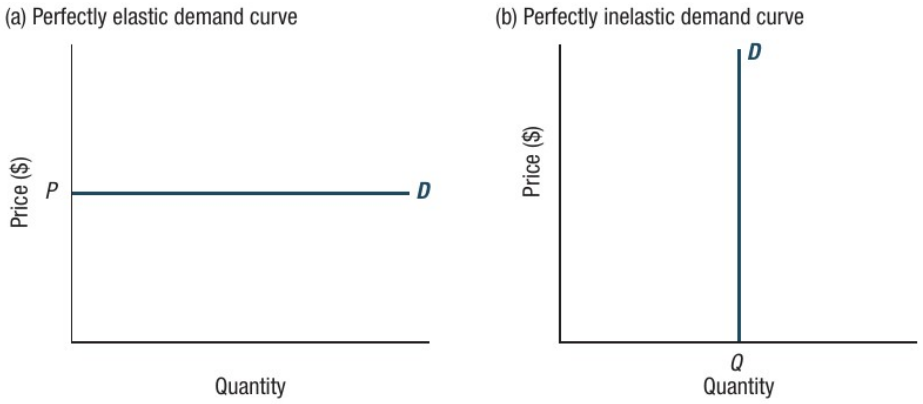
- Right Figure reproduces the linear demand curve for corn with $Q^d = 15 - 2P_{corn}$ and indicates the elasticity of demand at three prices along this demand curve: \$6, \$3.75, and \$1.50.

  When P=3.75, the amount demanded is Q=7.5. Since B=2, then, the elasticity of demand at P=3.75 is E^d = -2(3.75/7.5)=-1. Similar calculations imply that when P=6, the elasticity is E^d =-4 and that when P=1.50, the elasticity is E^d =-1/4.



- More generally, $E^d = -B(P/Q)$ tells us that, for a linear demand curve, demand is more elastic at higher prices than at lower prices, since then P is larger and Q is smaller. For example, in right Figure, we have $E^d < -1$ at prices above \$3.75, and $E^d > -1$ at prices below \$3.75.

1. $E^d < -1$: **elastic**, i.e., the % change in the amount demanded is larger (in absolute value) than the % change in the price.
2. $-1 < E^d < 0$: **inelastic**, i.e., the % change in the amount demanded is smaller (in absolute value) than the % change in the price.
3. $E^d = -\infty$: **perfect elastic** (horizontal demand curve)
4. $E^d = 0$: **perfect inelastic** (vertical demand curve)
5. $E^d = -1$: **unit elastic**

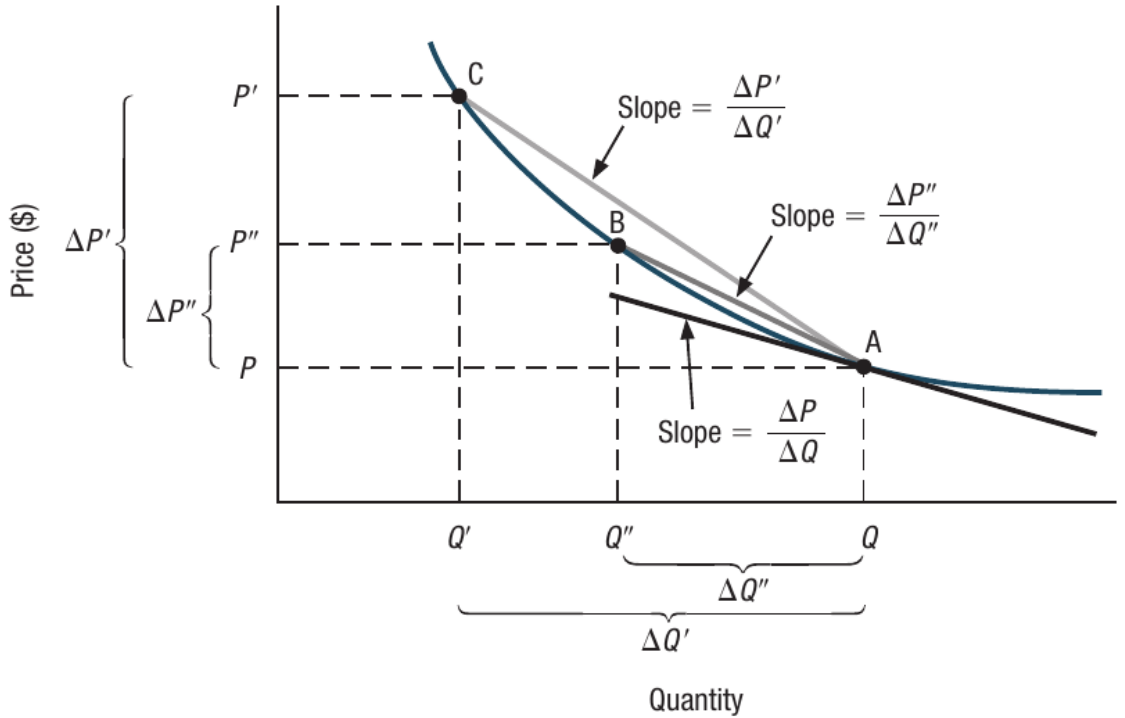


Elasticities of Demand & Supply:

The (Price) Elasticity of Demand

Non-Linear Demand

Slope of the Demand Curve at Price P. For the large price change from P to P', the light gray line connecting points C and A has the slope $(\Delta P'/\Delta Q')$. For the smaller price change from P to P'', the medium gray line connecting points B and A has the slope $(\Delta P''/\Delta Q'')$. As the price change grows smaller and smaller, the slope of the lines connecting the new and old demand points comes closer to the slope of the black line that is touching the demand curve at point A, known as the tangent line at point A. Thus, for small price changes, $(\Delta P/\Delta Q)$ comes to equal the slope of that tangent line, which is also called simply the slope of the demand curve at price P.



Elasticities of Demand & Supply:

The (Price) Elasticity of Demand

Non-Linear Demand

For a linear demand curve, (ΔP/ΔQ) is exactly the demand curve's slope.

What about for a nonlinear demand curve?

- In the right Figure, this slope equals the slope of the black line that is tangent to the demand curve at the point corresponding to price P, labeled point A.

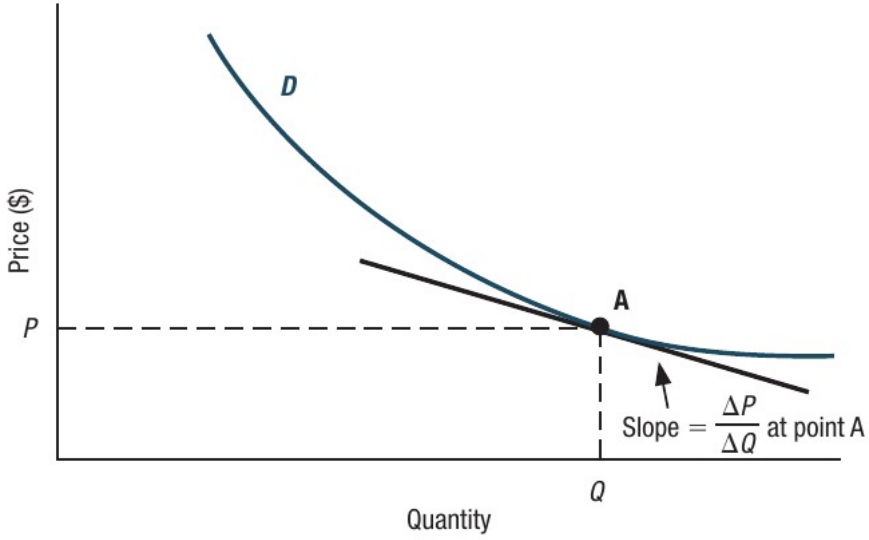
Constant elasticity (or isoelastic) demand curves:
the demand elasticity is the same at every price: $Q^d = AP^{-B}$

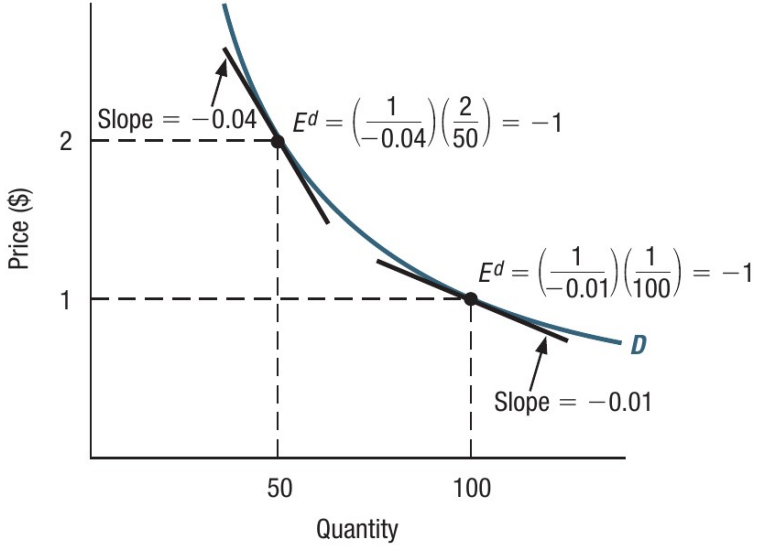
It is east to check: $E^d = -B$. **(Prove by yourself)**

- Another way to prove: Suppose the price increases from P to αP with α>1, then from the definition of the elasticity, we have

$$E^d = \frac{\left(\dfrac{A(\alpha P)^{-B} - AP^{-B}}{AP^{-B}}\right)}{\left(\dfrac{\alpha P - P}{P}\right)} = \frac{(\alpha^{-B} - 1)}{(\alpha - 1)}.$$

- Right figure is one example of ***Constant elasticity demand*** function: $Q^d = 100/P$





Elasticities of Demand & Supply:

The (Price) Elasticity of Demand

Total Expenditure and the Elasticity of Demand

The elasticity of demand for a product tells us:
How buyers' **total expenditure**, the product of the price and the quantity (P x Q), on the product changes,

1) when the price increases, and
2) when we move along the demand curve.

Proposition:

1. A small increase in price causes total expenditure to increase if demand is inelastic and decrease if demand is elastic.
2. Total expenditure reach the largest at a price for which the elasticity equals -1.

Proof by Intuition:

I. Suppose that a 1 percent price increase causes the quantity demanded to fall by 1 percent. If no change in quantity, the 1 percent increase in price would cause total expenditure to rise by 1 percent. With no change in price, the 1 percent drop in quantity would cause total expenditure to fall by 1 percent. So intuitively, the 1 percent increase in price and the 1 percent decline in quantity offset one another, leaving total expenditure unchanged.
Similarly, suppose a 1 percent price increase causes a less than 1 percent decline in quantity (inelastic), total expenditure will rise. If it causes a more than 1 percent decline in quantity (elastic), total expenditure will fall.

II. If demand was inelastic (-1,0), a small increase in price would increase the total expenditure. If it was elastic (<-1), a small decrease in price will raise total expenditure. If expenditure is at its largest possible value, neither a small increase nor a small decrease can increase total expenditure; demand must therefore be neither elastic nor inelastic, i.e., equal -1.

Elasticities of Demand & Supply:

The (Price) Elasticity of Demand

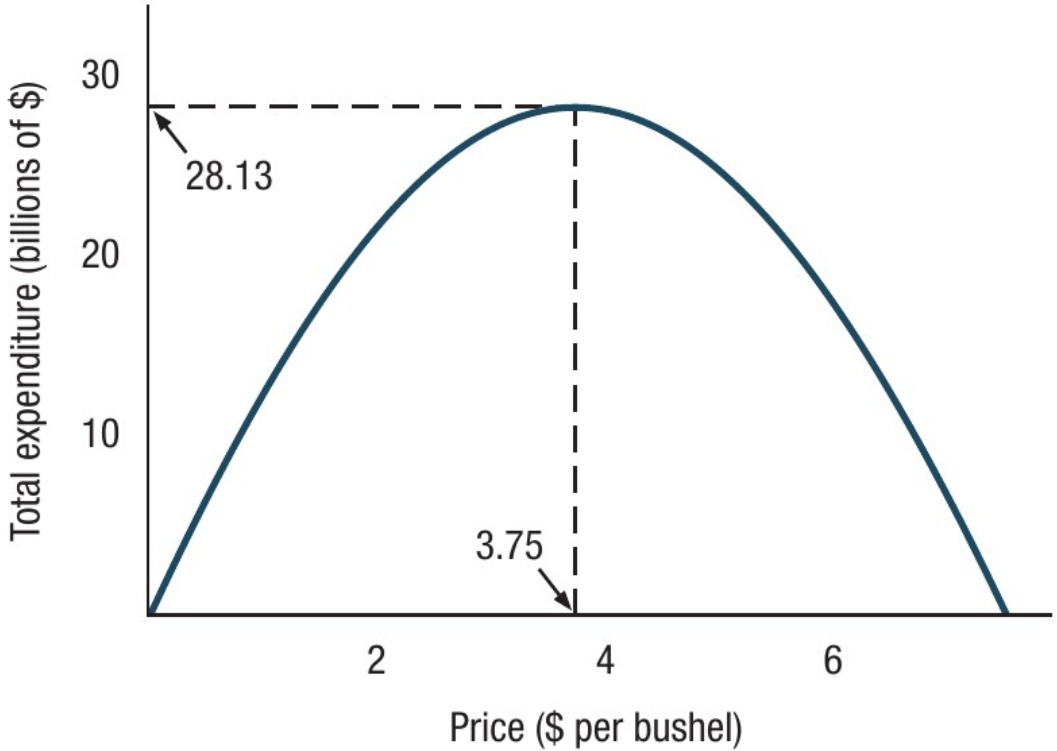
Total Expenditure and the Elasticity of Demand

EX:

Let us consider the total expenditure as:

$$P_{corn} \times Q_{corn} = P_{corn} \times (15 - 2P_{corn})$$

This right figure shows the total expenditure on corn for the demand curve on Page 3. Total expenditure increases when the price rises for prices below \$3.75, where demand is inelastic. It falls when the price rises for prices above \$3.75, where demand is elastic. It is largest when the price is \$3.75, where $E^d = -1$.



Elasticities of Demand & Supply:

The (Price) Elasticity of Supply

Economists also use elasticities to measure the responsiveness of supply to a product's price. The basic ideas are the same as for demand.

It equals the percentage change in the quantity supplied for each 1 percent increase in the price:

$$E^s = \frac{\%\text{change in quantity supplied}}{\%\text{change in price}} = \frac{\Delta Q/Q}{\Delta P/P}$$

where $\Delta Q = Q' - Q$ and $\Delta P = P' - P$.

We can also express the elasticity of supply as $E^s = \left(\frac{1}{(\Delta P/\Delta Q)}\right)(P/Q)$,where ΔP/ΔQ is the slope of the supply curve.

- $E^s > 1$: **elastic**, i.e., the % change in the amount supplied is larger (in absolute value) than the % change in the price.
- $0 < E^s < 1$: **inelastic**, i.e., the % change in the amount supplied is smaller (in absolute value) than the % change in the price.
- $E^s = +\infty$: **perfect elastic** (horizontal supply curve)
- $E^s = 0$: **perfect inelastic** (vertical supply curve)
- $E^s = 1$: **unit elastic**

Other Elasticities

- **Income elasticity of demand:** $E_M^d = \frac{(\Delta Q/Q)}{(\Delta M/M)}$ **[> 0: normal good**; **< 0: inferior good** (usually for low quality goods)**]**
- **Cross-price elasticity of demand:** $E_{P_o}^d = \frac{(\Delta Q/Q)}{(\Delta P_O/P_O)}$**,** where P_o is the price of other product.

In a similar fashion, we can measure the elasticities of supply for a product with respect to other factors, such as the prices of inputs or other outputs.

Market Equilibrium:

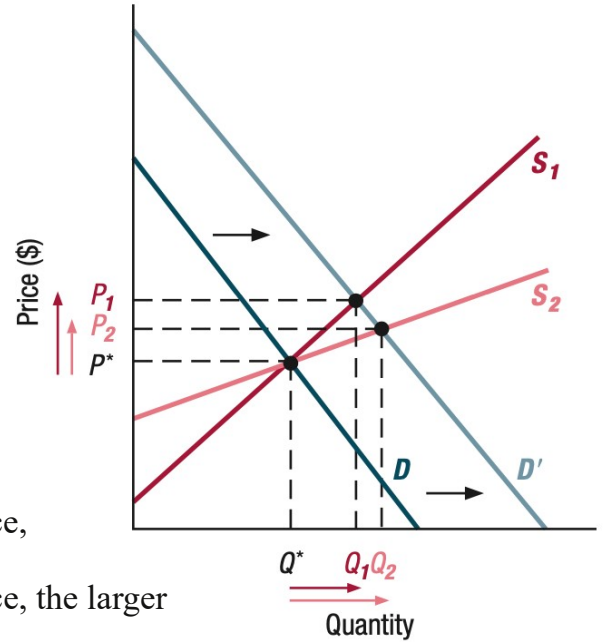
The Size of Changes in Market Equilibrium, Revisited:

We have seen that elasticities of demand and supply are a more convenient way to measure price responsiveness than is the steepness (or slope) of the demand and supply curves. Let's go back to that discussion how the size of the change in the market equilibrium, (P^*, Q^*), relates to elasticities.

When two different supply curves coincide at a particular price, the steeper one is always **less elastic** at that price. For example, both supply curves in the right Figure run through the initial market equilibrium point, (P*, Q*). Since the slope ($\Delta P/\Delta Q$) is smaller for the flatter curve and the value of P*/Q* is the same for both curves at the point of intersection, then

$$E^s = \left(\frac{1}{(\Delta P/\Delta Q)}\right)(P/Q)$$

implies that the flatter curve is more elastic at price P*.



Thus, for small shifts in the demand and supply curves, we have

Proposition:

1) When the demand curve shifts: the less elastic the supply curve at the initial equilibrium price, the larger the price change and the smaller the change in the quantity.
2) When the supply curve shifts: the less elastic the demand curve at the initial equilibrium price, the larger the price change and the smaller the change in the quantity.