



Chapters 3 and 4
Supply and Demand
and
The Market Strikes Back

Supply and Demand

A **competitive market** is a market in which there are:

- many buyers and sellers
- of the same good or service (homogeneous product)
- with “perfect” information to make the best choices.

The basic intuition is simple:

- The more you have to give up to get something, the less you are willing to get it.
- The more you get for doing something, the more you are willing to do it.

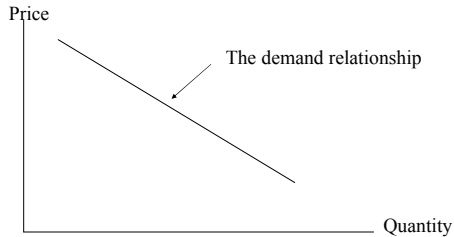
The **supply and demand model** is a model of how a competitive market works.

Demand, Desire, and Need

- Individual desire for something is different than individual demand.
- An individual can desire anything but to demand it, the individual must be willing and able to pay for it.
- Price is the determining factor for individual demand given that all other things stay constant.
- Demand assumes people are willing and able to substitute, or go without, if the price is too high.
- “Need” implies people are unwilling/unable to substitute, at any price.

The Law of Demand

The law of demand is that quantity-demanded has an inverse relationship to price.



The Demand Curve and Schedule

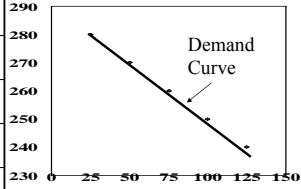
- This relationship is called the demand curve when it applies to actual commodities.
- A demand schedule is a tabular representation of the demand curve.
- Since demand for things will change over time, the demand curve represents the relationship at a specific period in time.
- The demand curve and/or demand schedule is used to determine the quantity demanded at a specific price during a specific period of time.

Market Demand

- Individual demand is sometimes “either/or” rather than “how much,” and is not usually that important to economists.
- What is important is how those individual demand relationships act in the overall market for this particular product.
- The following demand schedule and curve could be created by totaling up individual demand.

Demand for DVD Recorders

Price (\$)	Quantity Demanded
280	25
270	50
260	75
250	100
240	125

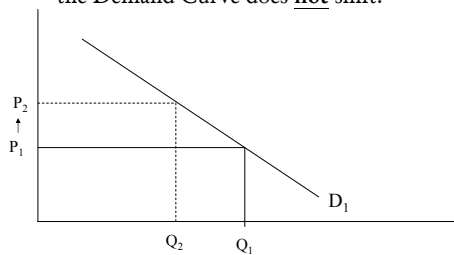


The Demand Function

- We can write the demand function as the following:
 - $q^D = f^D(P; \text{shift variables})$
- Quantity-demanded is an endogenous variable, but economists usually put it on the horizontal axis.
- Shift variables include:
 - Preferences or tastes
 - Number of buyers
 - Buyers' Income
 - Prices of related goods (substitutes or complements)
 - Information and expectations

Change in Price

When P changes,
the Demand Curve does not shift!



Two Effects of a Price Change

- Helping to explain why the demand curve is a negatively sloping line are two principles.
 - The substitution effect of a price change, which results from a change in the relative price between goods.
 - The income effect of a price change, which results from a change in the purchasing power of income.

Substitution Effects

- Usually, there are more than one product that will satisfy a particular want or need. These are called substitutes.
- When the relative price of a good **falls**, consumers are more willing to purchase this good instead of its substitutes.
- When the relative price of a good **increases**, consumers are less willing to purchase this good.
- If other goods also see proportional price increases, there will be no substitution effect.

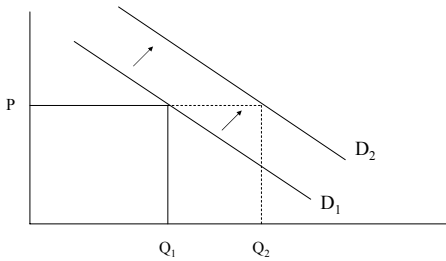
Income Effects

- **Money income:** Number of dollars received per period of time, also called nominal income.
- **Real income:** Income measured in terms of the goods and services it can buy, also called purchasing power.
- A price change for a good doesn't change your money income, but it can change your real income.
- The size of an income effect depends on whether or not the good takes up a lot of your budget. *Rent vs. pencils.*
- When the price of a good decreases, real income increases.
- When the price of a good increases, real income

Other Variables

- Exogenous shift variables include:
 - Preferences or tastes
 - Number of buyers
 - Buyers' Income
 - Prices of related goods (substitutes or complements)
 - Information and expectations
- Instead of moving along the curve, they will shift the demand curve in one of two directions.

Increase In Demand



What increases Demand?

- An increased preference (e.g., a fad)
- An increase in the number of buyers
- An increase in income (usually)
- An increase in the price of a substitute
- A decrease in the price of a complement
- A change in information or expectations can also increase preferences.
- A decrease in the good's own price does NOT shift demand! Instead, q^D slides along demand.

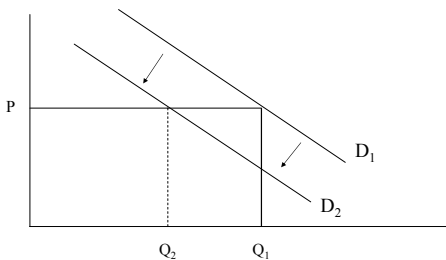
The Income Effect, Again

- When real income increases, demand for most **normal** goods also increases, but demand for **inferior** goods decreases.
- When nominal income changes, this is exogenous – and demand shifts.
- When real income changes because the good's own price changes, this is endogenous – and demand does not shift (instead, quantity-demanded slides along the demand curve).

Substitutes and Complements

- An increase in the price of DVDs makes you more willing to buy a DVD player. When the relationship between q^D and another good's price is negative, these two goods are complements.
- An increase in the price of movie theater tickets makes you more willing to buy a DVD player. When the relationship between q^D and another good's price is positive, these two goods are substitutes.
- An increase in the price of pencils does not affect the demand for DVD players. These two goods are unrelated.

Decrease In Demand



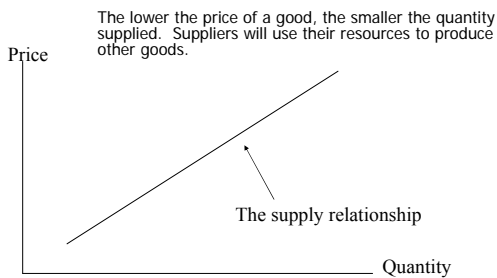
What decreases Demand?

- An decreased preference (e.g., a fad ends)
- A decrease in the number of buyers
- An decrease in income for normal goods, an increase in income for inferior goods.
- A decrease in the price of a substitute, or an increase in the price of a complement.
- A change in information or expectations can also decrease preferences.
- An increase in the good's own price does NOT shift demand!

The Supply Function

- We can write the supply function as the following:
 - $q^S = f^S(P; \text{shift variables})$
- Quantity-supplied is also an endogenous variable.
- Shift variables include:
 - Technology
 - Number of producers
 - Prices of inputs (factors of production)
 - Fixed factors (hard to adjust in the short-run)
 - Prices of related goods (alternative production choices can also be substitutes or complements)
 - Information and expectations

The Law of Supply

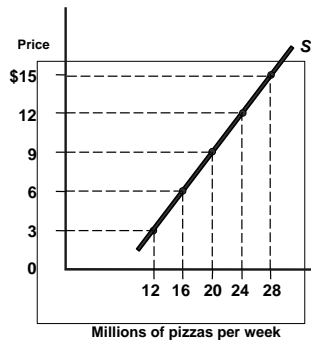


Supply Schedule and Curve

- Higher prices also increase producer's ability to supply the good. The marginal cost of production increases as output increases; it costs a little bit more to make the next unit of output than it did to make the previous one.
- As with the demand curve, the quantity supplied can be modeled for each price level.
- This is done with a supply schedule or a supply curve.

Supply Schedule and Curve for Pizzas

Supply Schedule	
Price per Pizza	Quantity Supplied per Week (millions)
\$15	28
12	24
9	20
6	16
3	12



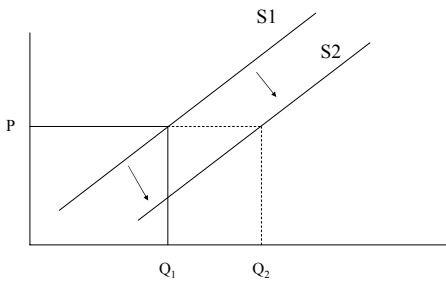
Change in Quantity-Supplied

- Suppose pizza is priced at \$6: the quantity that pizza makers are willing to supply is 16 million per week.
- If the price is raised to \$12, suppliers have more incentive to produce pizzas, and can afford to hire more workers, buy more dough, et cetera.
- The point will move along the line as the price increases.
- The new amount the suppliers are willing to produce increases to 24 million per week.
- The change in price does NOT shift the supply curve. Quantity-supplied slid along it.

Firm and Market Supply

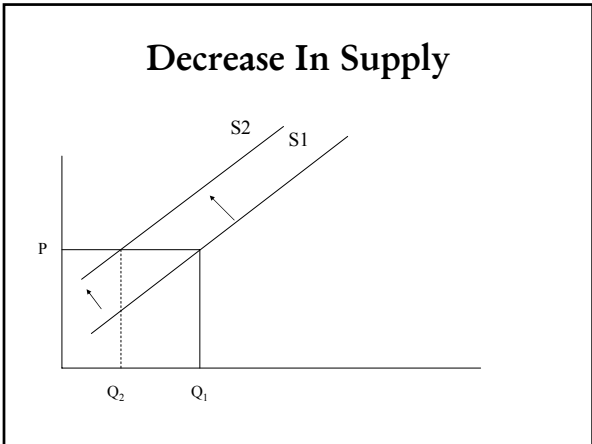
- Individual firms choose whether to produce a product or not, and how much of the product to produce. A firm's individual supply curve is generally upward-sloping.
- The market supply is the horizontal sum of the quantities produced by all firms in the market supply.
- The market supply curve is also usually upward-sloping.
- A change in price will cause movement along the supply curve.

Increase In Supply



What increases Supply?

- A new technology to produce the good using fewer resources.
- An increased number of producers.
- Reduced input prices.
- More available fixed factors.
- Increased prices of byproducts (lumber, plywood), or decreased price for production substitutes (hamburgers vs. hotdogs).
- Information and expectations.
- NOT price.



- ### What decreases Supply?
- Technology does not usually regress, but can be lost.
 - An decreased number of producers.
 - Increased input prices (cost of production rises).
 - Less available fixed factors.
 - Decreased prices of byproducts (lumber, plywood), or increased price for production substitutes (hamburgers vs. hotdogs).
 - Information and expectations.

- ### Demand and Supply Together
- As price P rises
 - Consumers will reduce their-quantity demanded along the demand curve.
 - Producers will increase their quantity-supplied along the supply curve.
 - The price where $q^S = q^D$ is called the market-clearing price.
 - Do supply and demand have to intersect? Consider the four quadrants...

Markets

- In a competitive market, buyers and sellers can choose whether to buy or sell or not at any given price, and how much, but they can't choose the price.
- In a free market, the price is not determined by any central authority, but by the interaction of supply and demand, through "market forces."

Demand and Supply for Pizzas

Suppose that the price for pizzas is initially set at \$12.

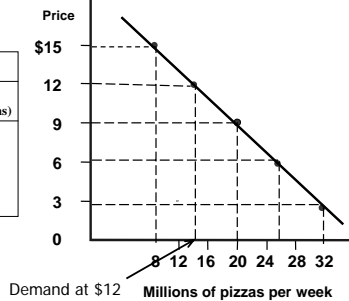
- > From the demand and supply schedules, buyers want 14 million pizzas while suppliers are willing to produce 24 million.
- > This creates a **surplus**.

Demand Schedule	
Price per Pizza	Quantity Supplied per Week (millions)
\$15	8
\$12	14
9	20
6	26
3	32

Supply Schedule	
Price per Pizza	Quantity Supplied per Week (millions)
\$15	28
\$12	24
9	20
6	16
3	12

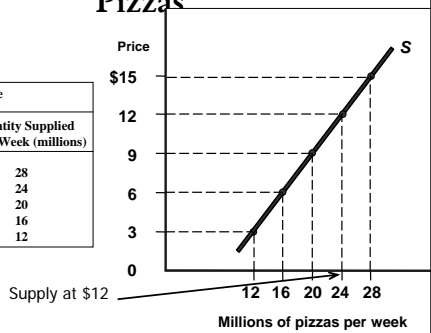
Demand Schedule and Curve for Pizzas

Demand Schedule	
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Supply Schedule and Curve for Pizzas

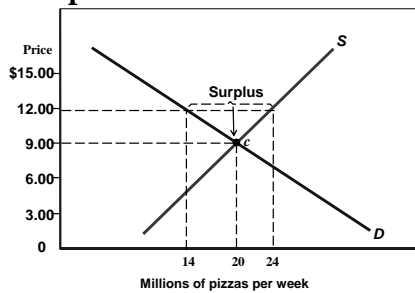
Supply Schedule	
Price per Pizza	Quantity Supplied per Week (millions)
\$15	28
12	24
9	20
6	16
3	12



Surplus

- There is a 10 million pizza surplus: there are more suppliers willing to sell pizza at \$12 than there are buyers who are willing to buy at that price.
- Some of those sellers will begin to lower their price because they have insufficient demand.
- As P falls, more people become willing to purchase pizza.
- As P falls, fewer suppliers are willing to produce pizza.
- Eventually, a price will be reached where all pizzas supplied will be bought at that price.

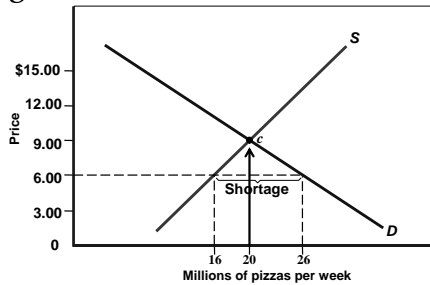
A Surplus of Pizzas



Shortage

- Suppose the price is initially \$6 instead of \$12: now the quantity-demanded for pizzas is 26 million but suppliers are only willing to produce 16 million, so there is a 10 million shortage of pizzas.
- Sellers will begin to raise their price, and some buyers are willing to pay a higher price because they can't find cheaper pizza elsewhere.
- At a higher price, more suppliers are willing to produce pizza, but some buyers are no longer willing to buy it.
- Eventually, there is a price at which everyone willing to buy at that price can get a pizza.

A Shortage of Pizzas



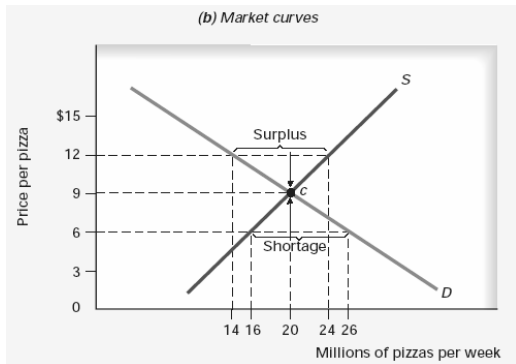
Equilibrium Point

- The market-clearing price is an equilibrium price.
- It is “stable” in the sense that any disequilibrium creates market forces that push P towards equilibrium.
- An hypothesis of this model is that any chronic shortage or surplus is caused by some external price control.

Market Schedule

Price/ pizza	Quantity Demanded	Quantity Supplied	Surplus or Shortage	Effect on Price
\$15	8	28	Surplus-20	Falls
\$12	14	24	Surplus-10	Falls
\$9	20	20	Equilibrium	Same
\$6	26	16	Shortage-10	Rises
\$3	32	12	Shortage-20	Rises

The Market for Pizzas

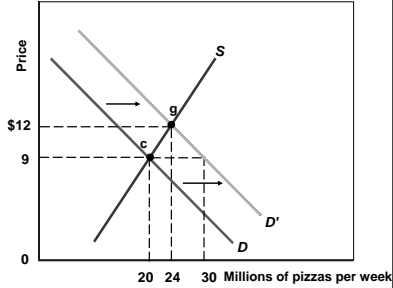


Equilibrium

- Each consumer and each producer makes a personal decision about how much to buy or sell at a given price, but the market requires no conscious coordination among consumers or producers.
- Market forces synchronize the personal and independent decisions of many individual buyers and sellers.
- Once a market reaches equilibrium, that price and quantity will prevail until one of the determinants (shift variables) of demand or supply changes.
- A change in any shift variable will usually change equilibrium price and quantity in a

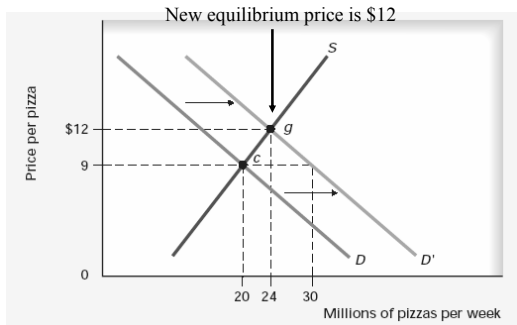
Effects of an Increase in Demand

- Suppose income rises, and pizzas are normal.
- Demand increases from D to D' .
- After D increases, the amount demanded at $\$9$ is 30 million – which exceeds the amount supplied of 20 million pizzas: this creates a shortage and upward pressure on price.



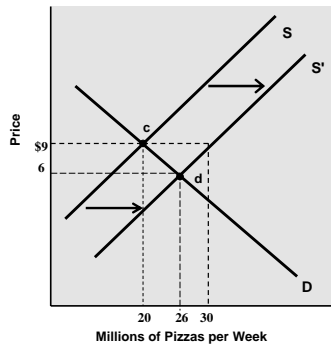
- As price increases, quantity-demanded decreases along the new demand curve, D' . The quantity-supplied increases along the existing supply curve, S , until the two quantities are in a new equilibrium.

Effects of an Increase in Demand

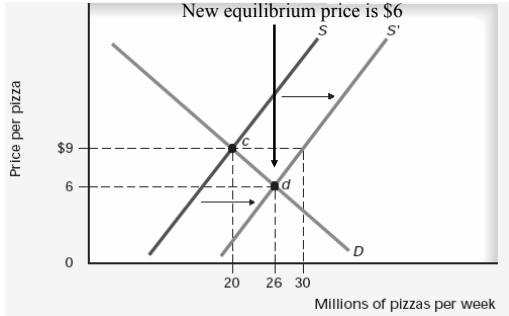


Effects of an Increase in Supply

- Suppose the price of flour falls.
- Supply shifts from S to S' rightward \rightarrow increases.
- After supply increases, the amount supplied at the initial price of $\$9$ increases from 20 to 30 million pizzas per week, creating a surplus.
- Surplus puts downward pressure on price, quantity-demanded increases along the existing demand curve until a new equilibrium is reached.

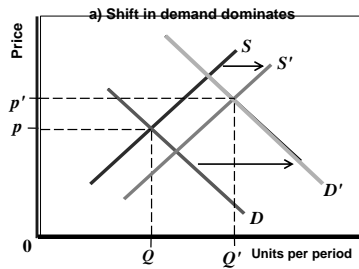


Effects of an Increase in Supply



Indeterminate Effect of an Increase in Both Supply and Demand

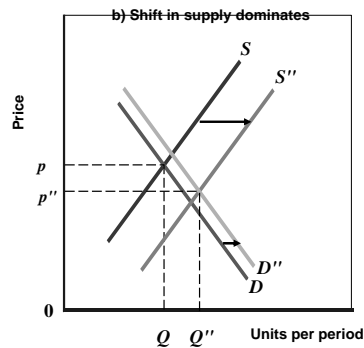
•Suppose supply and demand both increase and that demand increases more than supply, as shown by D' and S' .
 •Here both price and quantity increase
 •If both demand and supply were to decrease, for example from D' , S' to D and S , both equilibrium price and quantity would decline.



Indeterminate Effect of an Increase in Both Supply and Demand

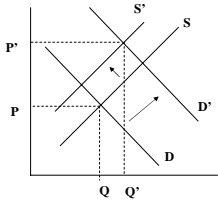
•Again, suppose both supply and demand increase but supply shifts by more than demand: price decreases from p to p'' and quantity increases.

•Conversely, if both supply and demand decrease with the shift in supply dominating, price will increase and quantity will decrease.

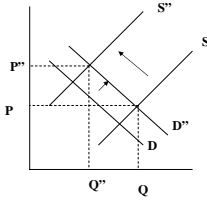


Demand Increases-Supply Decreases

■ Demand ↑ more than supply ↓

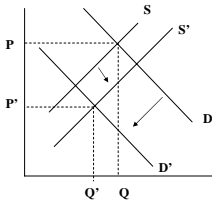


■ Supply ↓ more than demand ↑

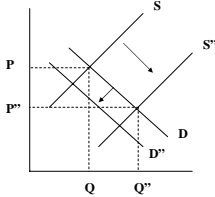


Demand Decreases-Supply Increases

■ Demand ↓ more than supply ↓



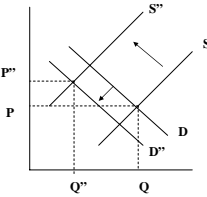
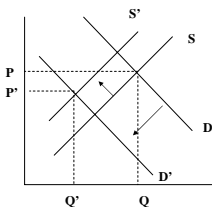
■ Supply ↑ more than demand ↓



Demand and Supply Both Decrease

■ Demand decreases most

■ Supply decreases most



Effects of Changes in Both Supply and Demand

		Change in Demand	
		Demand increases	Demand decreases
Change in Supply	Supply increases	Equilibrium price change is indeterminate. Equilibrium quantity increases.	Equilibrium price falls. Equilibrium quantity change is indeterminate.
	Supply decreases	Equilibrium price rises. Equilibrium quantity change is indeterminate.	Equilibrium price change is indeterminate. Equilibrium quantity decreases.

Disequilibrium Prices

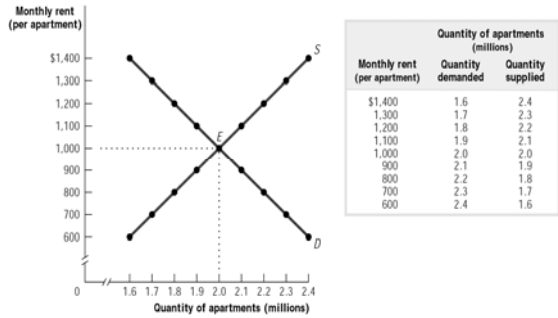
- **Disequilibrium** occurs when plans of buyers do not match plans of sellers.
- Disequilibrium is usually temporary as the market gropes for equilibrium.
- However, sustained disequilibrium can occur, either due to government control (e.g., price floors or price ceilings) or due to market failure (e.g., *the Great Depression and the labor market*).

Contents of Chapter 4: The Market Strikes Back

What happens if you try to prevent a competitive market from working?

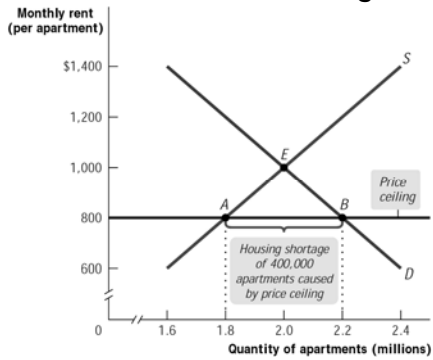
- Price controls
 - Price ceiling
 - Price floor
- Quantity controls—quota
- Excise tax
- Inefficiency

The Market for Apartments in the Absence of Government Controls



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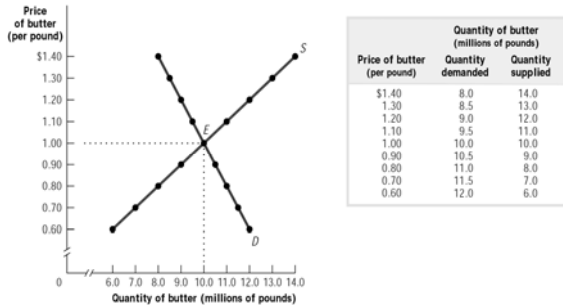
The Effects of a Price Ceiling



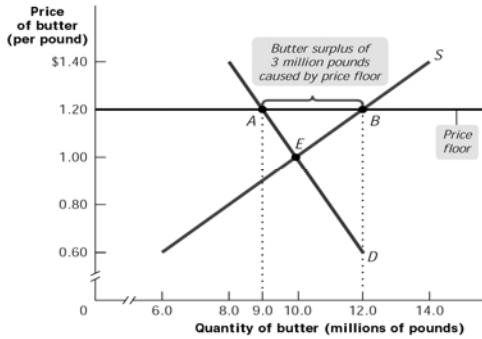
Consequences of a price ceiling:

- **Persistent Shortages** → not all buyers benefit.
- **Other forms of Rationing** (queuing, discrimination).
- **Wasted resources** (e.g., time spent waiting).
- **Preventing mutually-beneficial trades** → inefficiency.
- **Sellers don't compete for buyers** → inefficiently low quality.
- **Illegal activity** (black markets).

The Market for Butter in the Absence of Government Controls



The Effects of a Price Floor



Price floors often lead to inefficiency in the forms of:

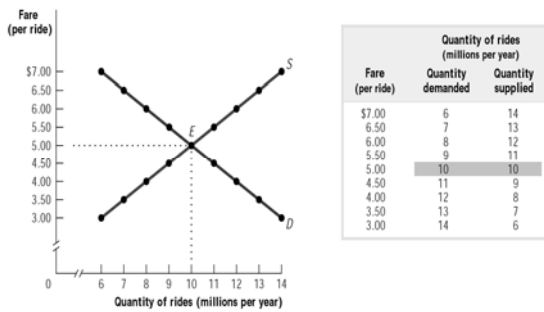
- *Persistent surpluses → not all sellers benefit.*
- *Need to dispose of excess supply without driving price down.*
- *Wasted resources used to produce unpurchased products.*
- *Preventing mutually-beneficial trades → inefficiency.*
- *Sellers compete for buyers, but can't reduce price → inefficiently high quality.*
- *Illegal activity (Ex.: black labor).*

Other Examples of Price Restrictions

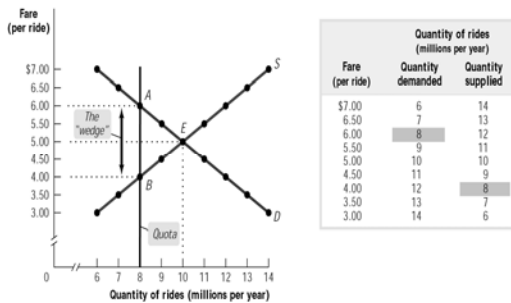
- Plywood before a hurricane → local governments try to prevent price-gouging, but many people cannot find wood to board up windows, and wood must be rationed.
- Minimum wage → some low-wage workers benefit, but some can't find jobs.
- Health insurance → buyers pay less than sellers receive, costs increase, uninsured pay higher prices.

What about restrictions on quantity, or taxes?

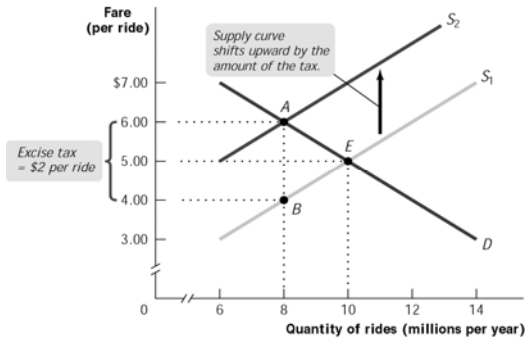
The Market for Taxi Rides in the Absence of Government Controls



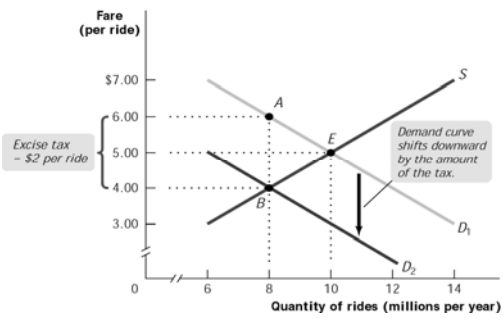
Effect of a Quota on the Market for Taxi Rides



An Excise Tax on Seller of Taxi Rides



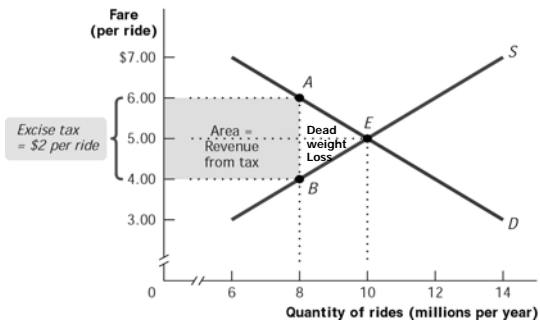
Excise Tax on Buyer of Taxi Rides



More on Quotas and Taxes

- Quotas have similar effects to taxes.
- Nominal tax incidence is who pays the tax, the buyer or the seller. Real tax incidence depends on how tax affects price.
- Nominal tax incidence is irrelevant to real tax incidence: both buyer and seller pay the tax.
 - If seller pays tax, supply falls and buyer's price will increase.
 - If buyer pays tax, demand will fall and seller's price will fall.
- Taxes create revenue for government, quotas create "rents" for sellers.
- Quotas and taxes create "deadweight loss" due to mutually-beneficial trades prevented.

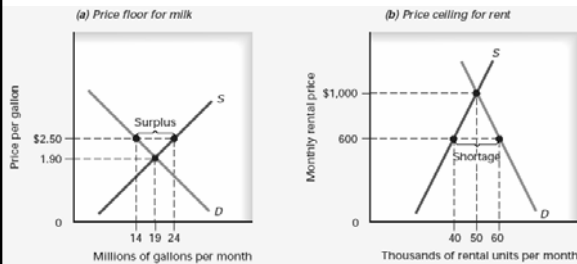
The Revenue from an Excise Tax



More on Price Controls

- To have an impact, a price floor must be set above the equilibrium price and a price ceiling must be set below the equilibrium price.
- Effective price floors and ceilings distort markets in that they create a surplus and a shortage, respectively.
- In these situations, various nonprice allocation devices emerge to cope with the disequilibrium resulting from the intervention.
- Price floors and ceilings also create a deadweight loss and rents for some buyers or sellers.

Price Floors and Price Ceilings



What about Making Markets Illegal?

Miller, Benjamin, & North, "Sex, Booze, and Drugs," *The Economics of Public Issues*, ch. 5.

- Black markets are created.
- There are usually fewer suppliers, so it is cheaper to go after them, and this leads to a higher price if successful.
- For consumers, the desire to avoid getting caught tends to lead to binge behavior, and a tendency to consume stronger products.
- High prices and illegal markets tend to attract sellers with a comparative advantage in violence and other illegal goods.
- The lack of legal recourse (e.g., contract enforcement) tends to lead to variable quality and private violence.

Consider, for example, underage drinking, prohibition, illegal prostitution in New Jersey vs. Nevada's legal brothels, marijuana, cocaine, and meth.

In Sum,...

- Competitive and complete markets with full information are efficient means of rationing economic goods to those willing and able to pay for them. They coordinate allocation, production, and distribution without a centralized authority telling people what to do. As we will demonstrate later, they maximize the difference between total value created and total resource value used.
- Markets may fail to be competitive, complete, or full-information, and if so they may not be efficient. Even efficient markets may also lead to outcomes that many members of society do not like.
- There may thus be reasons for government to interfere in markets – through price controls, quotas, taxes, or even banning the market – but intervention usually creates unintended consequences.
