

Introduction to Microeconomics

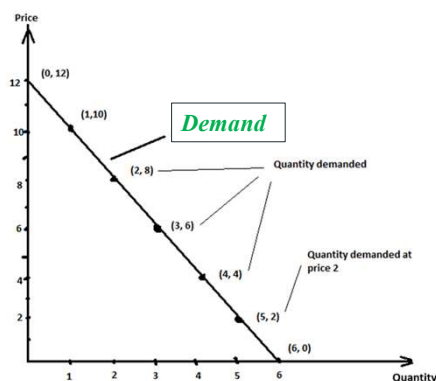
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ECO 1001

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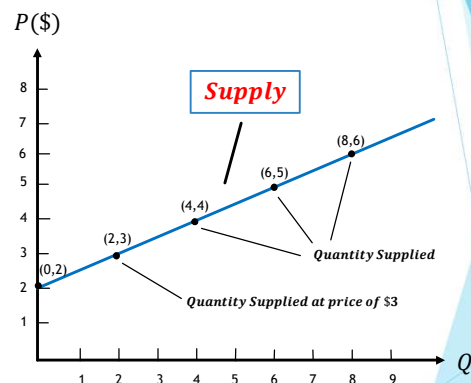
Back to the Market for Cookies



Demand function:

$$Q^d = -\frac{1}{2}P + 6$$
 Inverse demand function:

$$P = -2Q^d + 12$$



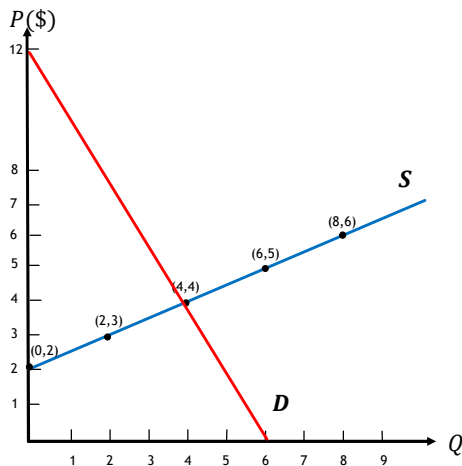
Supply function:

$$Q^s = 2P - 4$$
 Inverse supply function:

$$P = \frac{1}{2}Q^s + 2$$

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Market Equilibrium



Market equilibrium: $Q^d = Q^s$

At this point, sellers are selling everything they want to sell *at price p* and buyers are buying everything they want to buy *at price p*.

Solving for the equilibrium point:

$$Q^D = Q^S$$

$$-\frac{1}{2}P + 6 = 2P - 4$$

$$P^* = 4$$

$$Q^* = Q^{S^*} = Q^{D^*} = 4$$

P^* : the market equilibrium price

Q^* : the market equilibrium quantity

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What if We're Not at Market Equilibrium?

Suppose for some reason the prevailing price is higher than the equilibrium $P^*=4$. Suppose it's \$6.

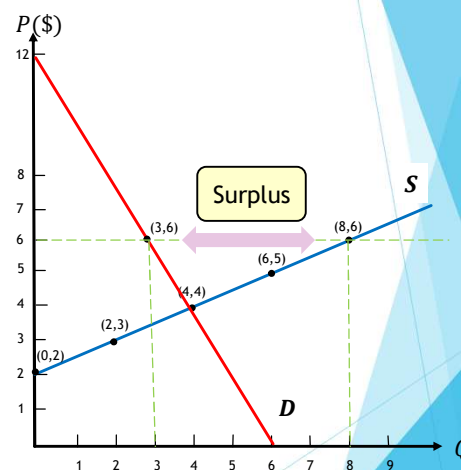
$$Q^d = -\frac{1}{2} \times 6 + 6 = 3$$

$$Q^s = 2 \times 6 - 4 = 8$$

$$Q^s > Q^d \Rightarrow \text{Surplus}$$

If $Q^s > Q^d$, there is more product on the market that people aren't buying, *and* that sellers are willing to sell for less than \$6. People would be willing to buy it if the price just went slightly down. This puts downward pressure on prices.

$P \downarrow$, then, $Q^d \uparrow$ and $Q^s \downarrow$, until they equalize



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What if We're Not at Market Equilibrium?

Suppose for some reason the prevailing price is lower than the equilibrium $P^*=4$. Suppose it's \$3.

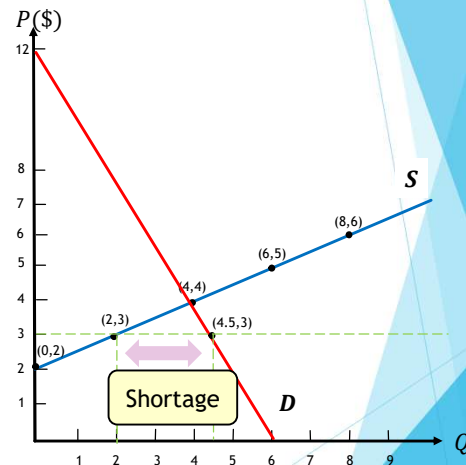
$$Q^d = -\frac{1}{2} \times 3 + 6 = 4.5$$

$$Q^s = 2 \times 3 - 4 = 2$$

$$Q^s < Q^d \Rightarrow \text{Shortage}$$

If $Q^s < Q^d$, there are still people willing to buy the product at that price and higher, *and* sellers that are willing to sell if the price just went up a little bit more. This puts upward pressure on prices.

$P \uparrow$, then $Q^d \downarrow$, and $Q^s \uparrow$, until they equalize



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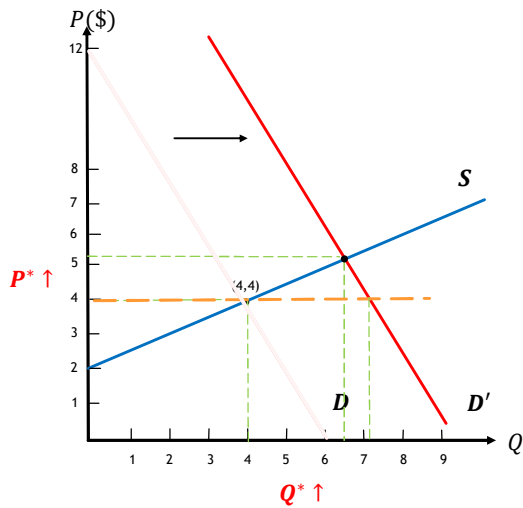
Changes in Equilibrium

Changes in the Market Equilibrium can come from

1. A change in demand
2. A change in supply
3. A change in *both* demand and supply

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Change in Demand



In our example, suppose
 \uparrow in Income, and assume cookies
 are normal goods.
 $\Rightarrow \uparrow D$ (shift right)
 $\Rightarrow \uparrow P^*$ and $\uparrow Q^*$

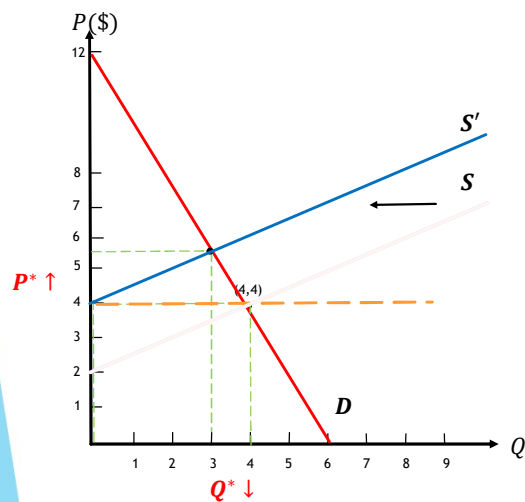
Now, suppose that instead
 \downarrow in P of muffins (substitute in
 consumption for cookies)
 $\Rightarrow \downarrow D$ (shifts left)
 $\Rightarrow \downarrow P^*$ and $\downarrow Q^*$

$\uparrow D \Rightarrow \uparrow P^*$ and $\uparrow Q^*$

$\downarrow D \Rightarrow \downarrow P^*$ and $\downarrow Q^*$

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Change in Supply



In our example, suppose instead
 \uparrow in P of chocolate (which is used to
 make cookies)
 $\Rightarrow \downarrow S$ (shifts left)
 $\Rightarrow \uparrow P^*$ and $\downarrow Q^*$

Suppose instead that new machines are
 made that can churn out more cookies
 per minute
 $\Rightarrow \uparrow S$ (shifts right)
 $\Rightarrow \downarrow P^*$ and $\uparrow Q^*$

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From the Reading

40% of a new car's cost is electronic systems

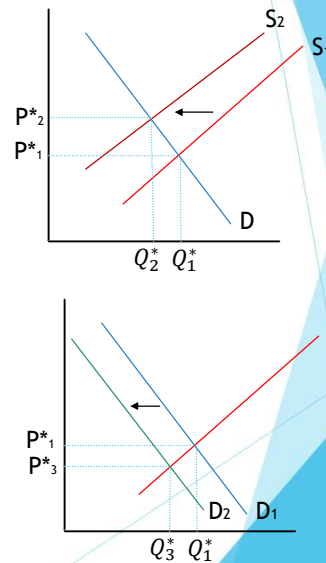
Semiconductor-based systems to continue to increase in cost

"In 2022, the semiconductor chip shortage squeezed the supply of new cars and drove up prices, shrinking the pool of potential buyers."... "A lot of chip supply was diverted to the consumer electronics industry and away from the auto industry." →

"...Since then, Nelson said consumer demand has taken another drastic turn, moving away from those gadgets and freeing up chips for vehicle production. "

"The idea that there's a recession on the horizon is keeping people from spending large amounts of money, and large amounts of money means new cars" →

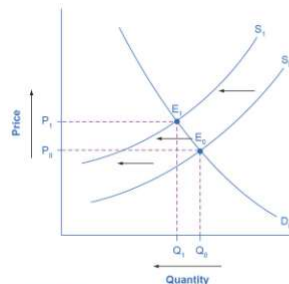
"Into '23, the shift may slide more toward the consumer and less toward the dealer," Fiorani said.



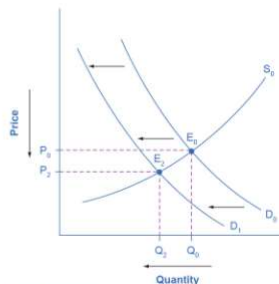
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From the Textbook : Changes in Both Supply and Demand

"The U.S. Postal Service is facing difficult challenges. Compensation for postal workers tends to increase most years due to cost-of-living increases. At the same time, increasingly more people are using email, text, and other digital message forms such as Facebook and Twitter to communicate with friends and others." (p.67)



(a) Shift in supply



(b) Shift in demand

↓ Q^*
But P is "indeterminate"
(i.e., we cannot tell
through these shifts
alone). Why?

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Changes in Both Supply and Demand

↑ in Income, and assume cookies are a normal good

$$\uparrow \text{ in Income} \Rightarrow \uparrow D \Rightarrow \uparrow P^* \text{ and } \uparrow Q^*$$

And ↑ in P of chocolate (which is used to make cookies)

$$\uparrow \text{ in Cost} \Rightarrow \downarrow S \Rightarrow \uparrow P^* \text{ and } \downarrow Q^*$$

$$\Rightarrow \uparrow P^* \text{ (price increases) but } Q^* \text{ is "indeterminate"}$$

- ▶ Will depend on the slope of D and S and how much they shift

Advice: do not to graph shift in supply and shift in demand on the same graph!
Use two separate graphs, or new Q^* may seem lower or higher just depending on how you sketch out your graph.

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Example: Market for Cellphones

- ▶ Over time, ↑ D for cellphones

$$\Rightarrow \uparrow P^* \text{ and } \uparrow Q^*$$

- ▶ Over time, technology also improves, lowering cellphone production costs

$$\Rightarrow \downarrow \text{ in Cost} \Rightarrow \uparrow S$$

$$\Rightarrow \downarrow P^* \text{ and } \uparrow Q^*$$

Theoretically, then, P^* is "indeterminate" and $Q^* \uparrow$

- ▶ Historical data shows us that ↓ P^*

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Governments in Markets

Among many things, a government can set

- **Price ceilings** - maximum price at which a good/service can be legally sold (e.g., rent controls; rules on price gouging)
- **Price floors** - minimum price at which a good/service can be legally sold (e.g., minimum wage)
- **Taxes** - levied on sellers for goods/services sold or on buyers for goods/services bought
- **Production quota** - maximum quantity of a good that can be produced in a certain period
- **Production subsidy** - payment made by the government to a producer for goods/services produced

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Price Ceiling Common Example: Rent Ceilings

Suppose the market equilibrium price $P^* = \$1000$. Where should a government set a price ceiling to make housing more affordable?

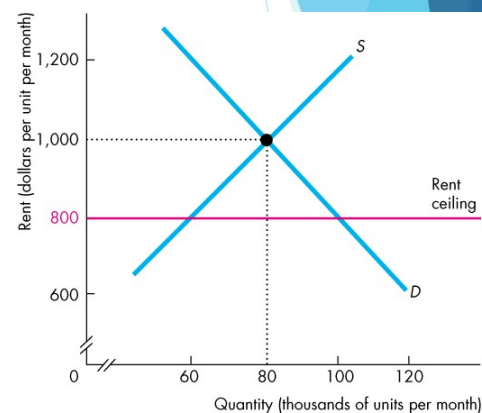
Above or below P^* ?

To be effective, a price ceiling has to be *below* the market equilibrium price.

What happens if the government sets a price ceiling of \$1200?

If the ceiling is set *above* the market equilibrium price, the ceiling is not binding and the market equilibrium will be achieved.

- To be effective, price ceilings should be *below* the equilibrium price, making the equilibrium illegal.



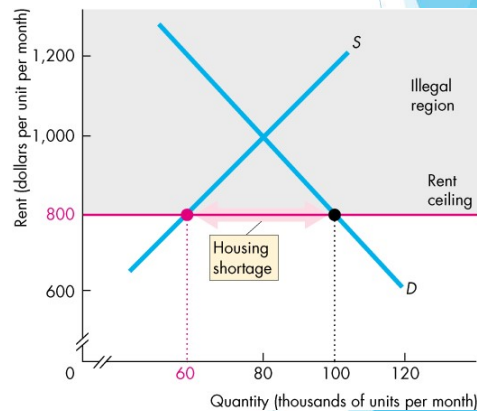
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Price Ceiling

When a price ceiling is imposed, do we have a shortage or a surplus?

Shortage of 40 thousand units (100-60)

Notice that shortage is always in terms of quantity, not in dollars



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Price Ceiling - Mathematically

$$\begin{cases} D: Q^d = -\frac{1}{10}P + 180 & (P = -10Q^d + 1800) \\ S: Q^s = \frac{1}{10}P - 20 & (P = 10Q^s + 200) \end{cases}$$

$$P^* = 1000, Q^* = 80$$

If a price ceiling of \$800 is imposed

$$Q^d = 100, Q^s = 60$$

$$\text{Shortage: } Q^d - Q^s = 100 - 60 = 40 \text{ units}$$

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Price Ceiling

If there's a shortage due to a price ceiling, who gets the goods? In this case, who gets the rental units?

Some solutions in the real world:

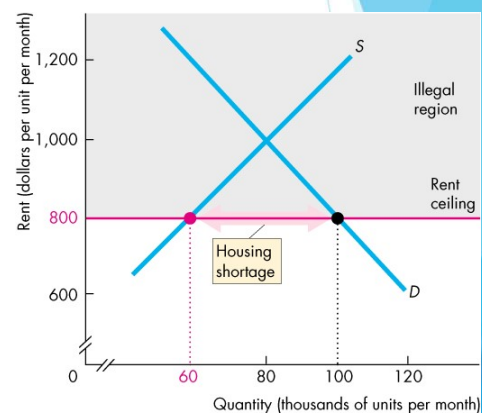
1. **Highest bidder** - not enough to combat the shortage, since many people are willing to pay above the ceiling but can't
2. **"First come, first served"** - Cost of apartment = Rent (\$800) + Value of Time (consider a waiting list of 30,000 people, for example) - increases search activities from buyers, since there's an advantage to being the *first* to finding a unit
3. **Lottery**
4. **Black market trades**
5. **Competition or Violence**
6. **Discrimination** (landlord chooses, e.g. don't accept students)

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Price Ceiling

Increased search activity - would-be buyers spend more time looking for the good (in this case, housing)

- ▶ So the ceiling might keep the financial cost down, but the opportunity cost = the financial cost *plus the* value of the time buyers spend finding the good
- ▶ As a renter, you might spend less *money* finding housing, but your time also has value, and you spent more of that finding housing.

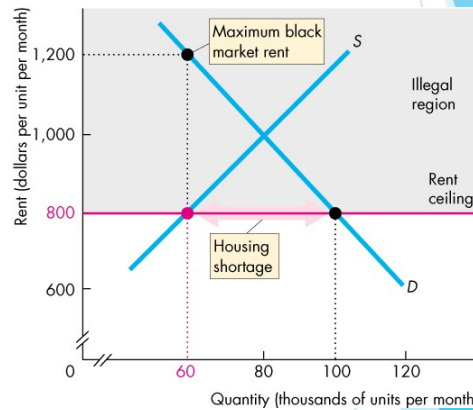


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Price Ceiling

If the ceiling is not accompanied by strict policing/enforcement, it can also create a **black market**.

- ▶ In this example, with the shortage, *someone* is willing to pay \$1200 - if there's a seller willing to take the risk, they can charge up to \$1200 in the black market.
- ▶ If enforcement is very lax, we will get close to equilibrium - buyers willing to pay over the price ceiling and more sellers willing to take that risk.



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Price Floor Common Example: Minimum Wage

In the case of minimum wage, **people are the sellers** and **employers are the buyers**. People are selling their labor, employers are buying the labor.

Suppose the market equilibrium price $P^* = \$9$. That is, the equilibrium wage is \$9. Where should a government set the minimum wage if it wants to affect the equilibrium?

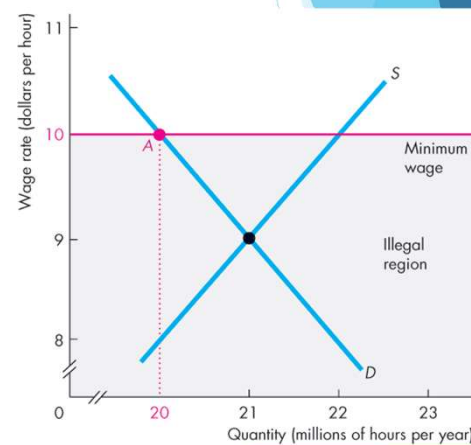
Above or below P^* ?

To be effective, a price floor has to be *above* the market equilibrium price.

What happens if the government sets a price floor of \$8?

If the floor is set *below* the market equilibrium price, the floor is not binding and the market equilibrium will be achieved. In this case, people would still be able to be paid \$9.

- ▶ Market floors are set *above* the equilibrium price, making the equilibrium illegal.



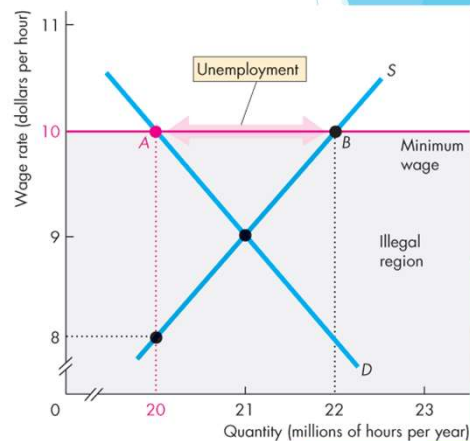
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Price Floor

When a price floor is imposed, do we have a shortage or a surplus?

Surplus - more people are willing to sell (because the price is high) than are willing to buy.

- ▶ In the case of labor, more people are looking to be employed (at this higher wage) than there are jobs.



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Efficiency and Equity

- ▶ Right after a hurricane, demand for certain items (roofing, water) might increase but most state governments have [laws against price gouging](#) (charging way more than normal prices for basic necessities)
 - ▶ Definitely more efficient to allow prices to adapt to increased demand
 - ▶ But is it fair? Desirable?
- ▶ In practice, many construction companies give out water for free after a hurricane, and housing supply prices don't actually increase. Why?

United States: Minnesota Files Price Gouging Suit Against Egg Producer

How to report price gouging after a natural disaster

Anti-price gouging law activated by state of emergency declaration

Attorney General Bonta Issues Consumer Alert on Price Gouging Following State of Emergency Declaration in El Dorado County Due to Caldor Fire

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