

Ch 4: The Market Forces of Supply and Demand

Buyers, sellers, and the price that balances them

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EC 111 Principles of Microeconomics, Bentley University, Fall 2026

Markets

A market

Buyers and sellers of one good

Buyers decide **demand** · sellers decide **supply**

Perfectly competitive

Many buyers, many sellers · identical goods

Everyone a **price taker**: takes the price, chooses only how much

Monday: buyers and sellers · Wednesday: the price that **balances** them, and what moves it

Why start here

Simplest case · wheat comes close · the logic carries over

Ch 1, principle 6

Markets are usually a good way to organize economic activity · this chapter is the mechanism

Demand

Quantity demanded

What buyers are **willing and able** to buy at a given price

Law of demand

Other things equal, price up $\Rightarrow$ quantity demanded down

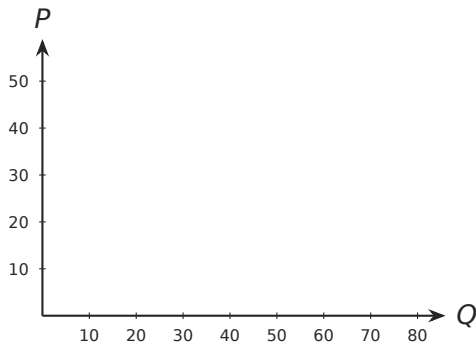
Other things equal: income, other prices, tastes, expectations, number of buyers all held fixed

We release them one at a time

Question

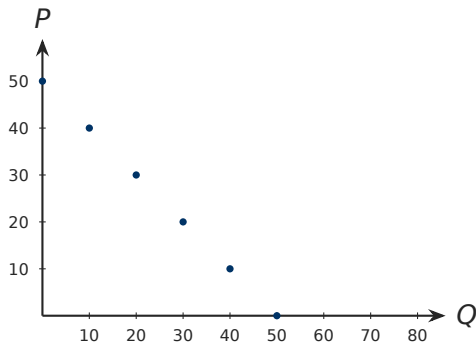
Coffee on campus goes from \$3 to \$6 a cup. What do you do? What does the campus do?

Demand schedule and demand curve



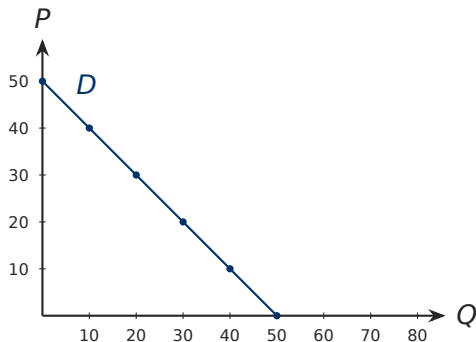
Price (\$)	Q_d
0	50
10	40
20	30
30	20
40	10
50	0

Demand schedule and demand curve



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10	40
20	30
30	20
40	10
50	0

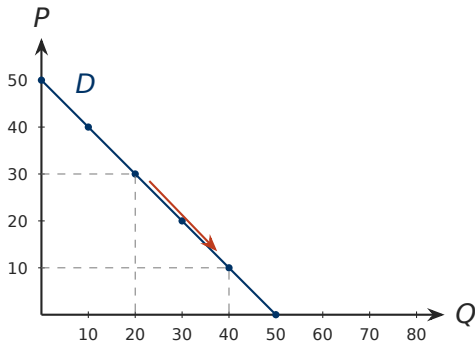
Demand schedule and demand curve



Price (\$)	Q_d
0	50
10	40
20	30
30	20
40	10
50	0

$$Q_d = 50 - P$$

Demand schedule and demand curve



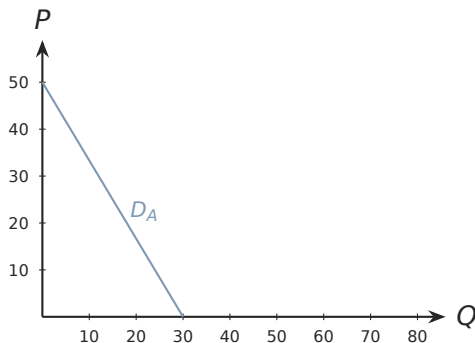
Price (\$)	Q_d
0	50
10	40
20	30
30	20
40	10
50	0

$$Q_d = 50 - P$$

Price \$30 $\rightarrow$ \$10: Q_d 20 $\rightarrow$ 40

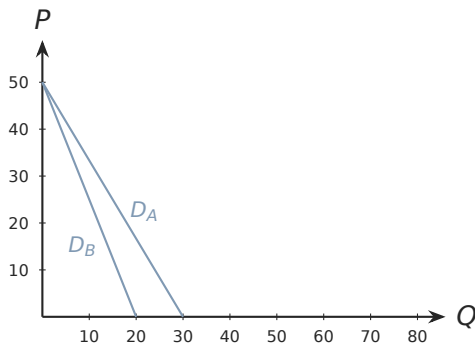
A **movement along** the curve

Market demand: add the buyers



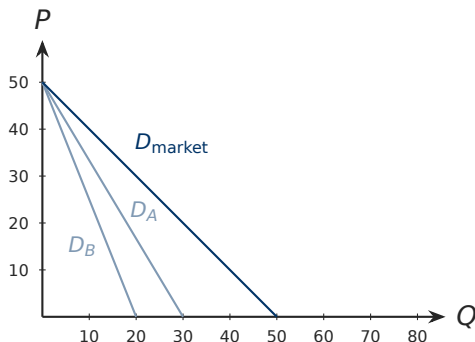
\$	A	B	Market
0	30	20	
10	24	16	
20	18	12	
30	12	8	
40	6	4	
50	0	0	

Market demand: add the buyers



\$	A	B	Market
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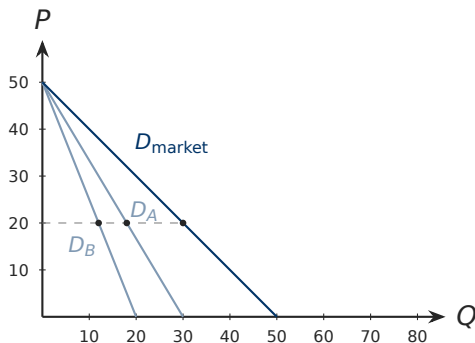


\$	A	B	Market
0	30	20	50
10	24	16	40
20	18	12	30
30	12	8	20
40	6	4	10
50	0	0	0

Same price · quantities **added**

Add *horizontally*, never
vertically

Market demand: add the buyers



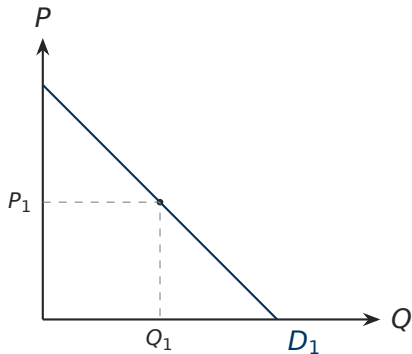
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Same price · quantities **added**

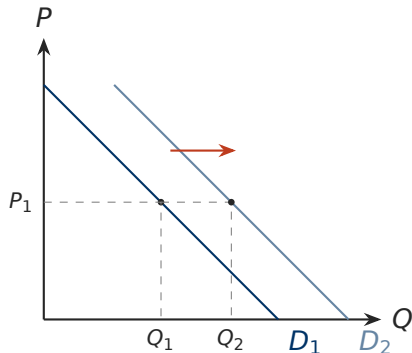
Add *horizontally*, never vertically

At \$20: $18 + 12 = 30$

Shift of the curve vs movement along it



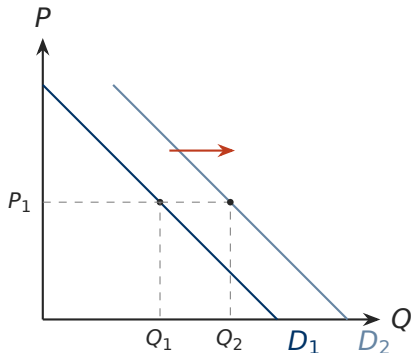
Shift of the curve vs movement along it



Change in demand: the curve **shifts**

Same price, different quantity ·
cause: anything *except* own price

Shift of the curve vs movement along it



Change in demand: the curve **shifts**

Same price, different quantity ·
cause: anything *except* own price

Change in quantity demanded:
a **move along** the curve

Cause: the good's own price

Rule

On an axis: move along · not on
an axis: shift

Income and the prices of other goods

Income

Normal good: income up, demand up

restaurant meals · flights

Inferior good: income up, demand down

instant noodles · bus rides

2008 recession: Spam sales rose, Hormel added shifts (NYT, Nov 2008)

About the *buyers*, not the good

Prices of related goods

Substitutes: one gets pricier, demand for the other rises
Coke and Pepsi · Spotify and Apple Music

Complements: one gets pricier, demand for the other falls
phones and apps · printers and ink

The *other* good's price shifts *this* curve · its own price never does

Five things that shift demand

Shifter	Change	Demand
Number of buyers	more buyers	right
Income	rises, normal good	right
	rises, inferior good	left
Price of a related good	substitute gets pricier	right
	complement gets pricier	left
Tastes	advertising, a health report, fashion	right
Expectations	higher price or income expected	right, <i>today</i>

Reverse the change, reverse the shift

“Increase in demand” always means **right** · never “up”

Shift or move? Spotify

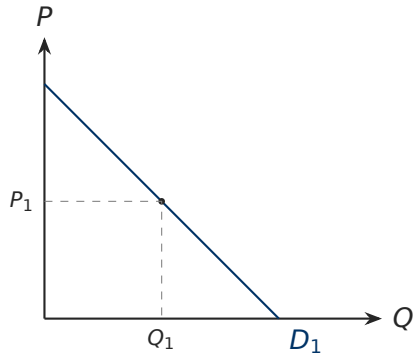
Spotify sells one subscription at one price in every country. Draw the demand curve. What does each event do to it?

- (a) Spotify launches in twenty more countries, same price
- (b) A global recession lowers incomes
- (c) Apple Music cuts its price
- (d) Smartphones get cheaper
- (e) A campaign promoting local artists
- (f) Economists warn a recession is coming
- (g) Spotify ends its free tier: new users must pay

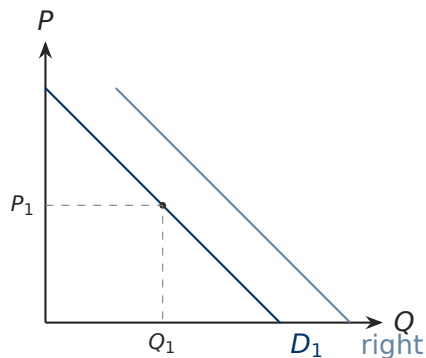
Question

For each: which shifter? Or is it the good's own price?

Spotify: answers



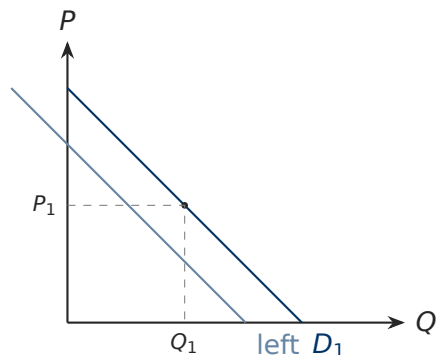
Spotify: answers



Right

(a) more buyers · (d) cheaper complement · (e) tastes

Spotify: answers



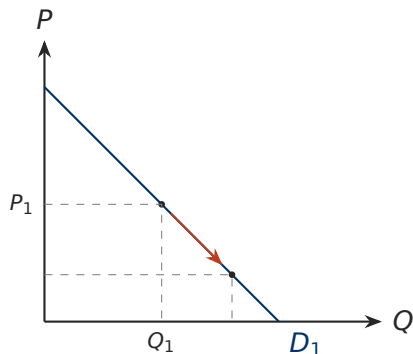
Right

(a) more buyers · (d) cheaper complement · (e) tastes

Left

(b) lower income, if normal · (c) cheaper substitute · (f) lower expected income

Spotify: answers



Right

(a) more buyers · (d) cheaper complement · (e) tastes

Left

(b) lower income, if normal · (c) cheaper substitute · (f) lower expected income

Movement along

(g) the price those users face goes from zero to the subscription price · own price, not a shifter

Supply

Quantity supplied

What sellers are willing and able to sell at a given price

Law of supply

Other things equal, price up $\Rightarrow$ quantity supplied up

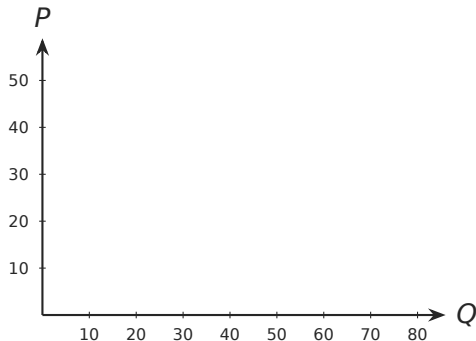
Higher price: each unit more profitable · existing sellers make more · marginal sellers enter

The supply curve slopes **up**

Question

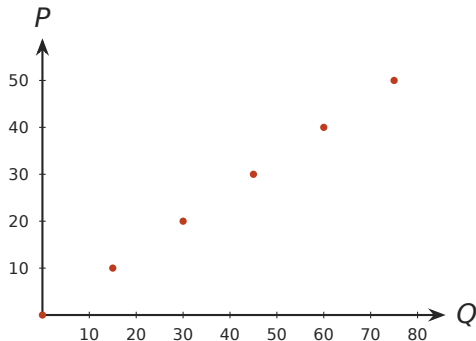
Coffee at \$6 a cup. What changes for the campus café? For the café that was closing?

Supply schedule and supply curve



Price (\$)	Seller 1	Seller 2
0	0	0
10	10	5
20	20	10
30	30	15
40	40	20
50	50	25

Supply schedule and supply curve



Price (\$)	Seller 1	Seller 2
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0	0	0
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10	10	5
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20	20	10
----	----	----

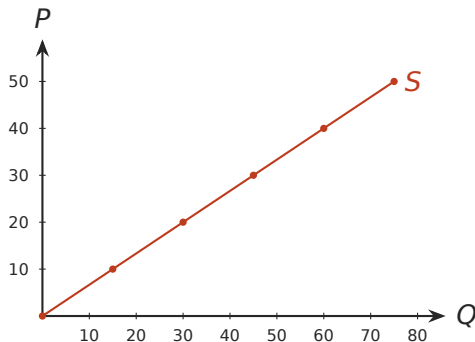
30	30	15
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40	40	20
----	----	----

50	50	25
----	----	----

Market: add horizontally

Supply schedule and supply curve

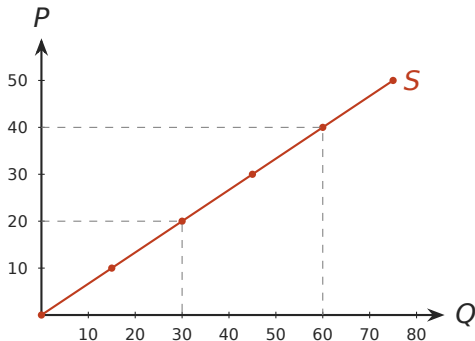


Price (\$)	Seller 1	Seller 2
0	0	0
10	10	5
20	20	10
30	30	15
40	40	20
50	50	25

Market: add horizontally

$$Q_1 = P \cdot Q_2 = 0.5P \cdot Q_s = 1.5P$$

Supply schedule and supply curve



Price (\$)	Seller 1	Seller 2
0	0	0
10	10	5
20	20	10
30	30	15
40	40	20
50	50	25

Market: add horizontally

$$Q_1 = P \cdot Q_2 = 0.5P \cdot Q_s = 1.5P$$

Price \$20 $\rightarrow$ \$40: Q_s 30 $\rightarrow$ 60

A movement along the curve

What shifts supply

Shifter	Change	Supply
Input prices	wages, materials, energy get cheaper	right
Technology	cost-saving improvement	right
Number of sellers	firms enter	right
Expectations	sellers expect a higher price later	left, <i>today</i>

Input prices and technology work through **cost** · expectations run **opposite** to demand

Two traps

Supply never shifts “up” or “down” · a curve that moves up is a *decrease* · read right and left

A substitute's price shifts *demand*, not supply

Shift or move? Electric cars

Question

Draw the supply curve for electric cars. What does each event do to it?

- (a) The price of lithium, used in batteries, falls
- (b) The price of electric cars falls
- (c) The price of gasoline cars falls

Shift or move? Electric cars

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Draw the supply curve for electric cars. What does each event do to it?

- (a) The price of lithium, used in batteries, falls
- (b) The price of electric cars falls
- (c) The price of gasoline cars falls

(a) Input cheaper · **supply shifts right**

Shift or move? Electric cars

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Draw the supply curve for electric cars. What does each event do to it?

- (a) The price of lithium, used in batteries, falls
- (b) The price of electric cars falls
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(a) Input cheaper · **supply shifts right**

(b) Own price · **movement down along** the supply curve · lower Q_s , no shift

Shift or move? Electric cars

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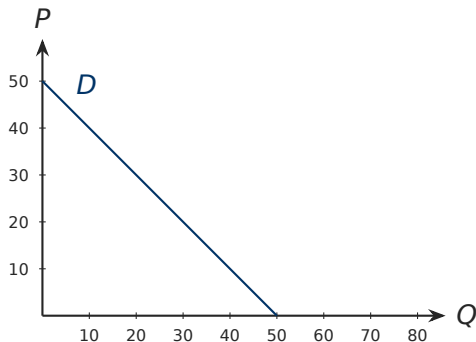
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- (b) The price of electric cars falls
- (c) The price of gasoline cars falls

(a) Input cheaper · **supply shifts right**

(b) Own price · **movement down along** the supply curve · lower Q_s , no shift

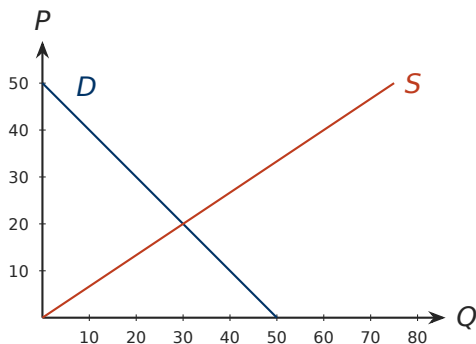
(c) Trick · gasoline cars are a substitute for *buyers* · **demand** for electric cars shifts left · supply does not move

Supply and demand together



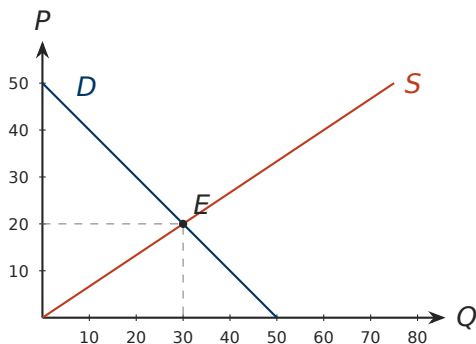
Price (\$)	Q_d	Q_s
0	50	0
10	40	15
20	30	30
30	20	45
40	10	60
50	0	75

Supply and demand together



Price (\$)	Q_d	Q_s
0	50	0
10	40	15
20	30	30
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Supply and demand together



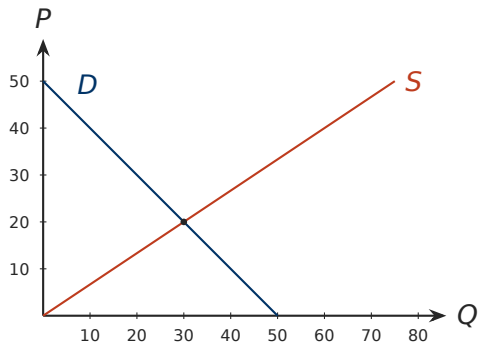
Price (\$)	Q_d	Q_s
0	50	0
10	40	15
20	30	30
30	20	45
40	10	60
50	0	75

Equilibrium: $Q_d = Q_s$

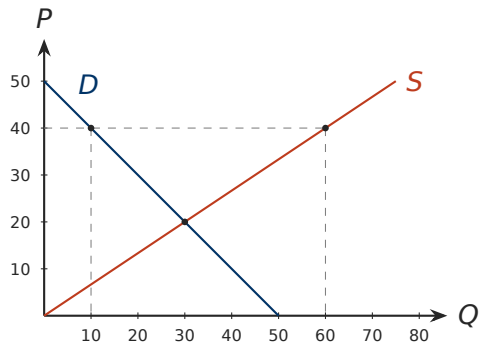
$$P^* = 20 \cdot Q^* = 30$$

Buyers' plans and sellers' plans agree

Above equilibrium: surplus

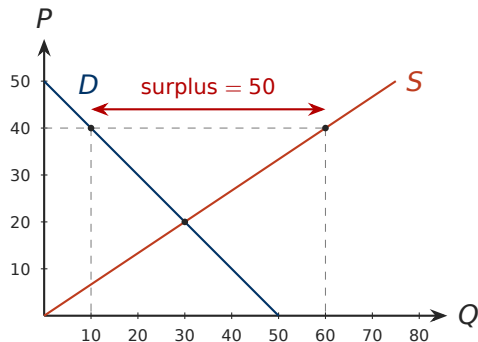


Above equilibrium: surplus



At $P = 40$: $Q_s = 60$, $Q_d = 10$

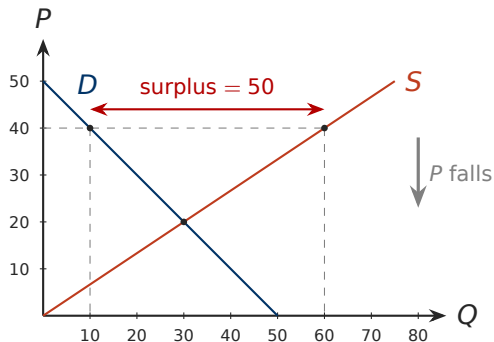
Above equilibrium: surplus



At $P = 40$: $Q_s = 60$, $Q_d = 10$

Surplus, excess supply:
 $60 - 10 = 50$

Above equilibrium: surplus



At $P = 40$: $Q_s = 60$, $Q_d = 10$

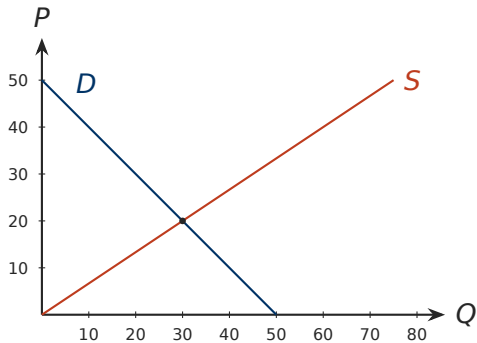
Surplus, excess supply:
 $60 - 10 = 50$

Unsold stock · sellers cut the price

Q_d rises along D · Q_s falls along S

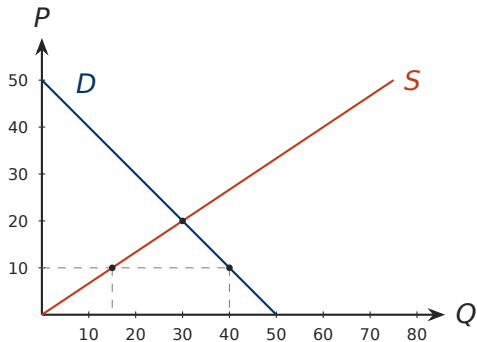
Surplus gone at \$20

Below equilibrium: shortage

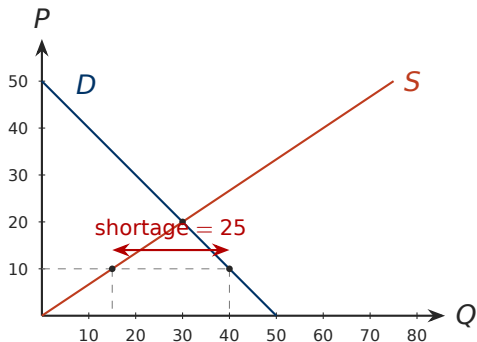


Below equilibrium: shortage

At $P = 10$: $Q_d = 40$, $Q_s = 15$



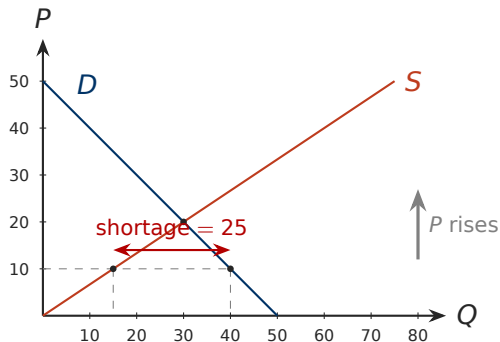
Below equilibrium: shortage



At $P = 10$: $Q_d = 40$, $Q_s = 15$

Shortage, excess demand:
 $40 - 15 = 25$

Below equilibrium: shortage



At $P = 10$: $Q_d = 40$, $Q_s = 15$

Shortage, excess demand:
 $40 - 15 = 25$

More buyers than units ·
sellers raise the price
 Q_d falls along D · Q_s rises
along S

Shortage gone at \$20

The price does the adjusting

Law of supply and demand

The price of any good adjusts to bring quantity supplied and quantity demanded into balance

Above equilibrium: surplus · price falls

Below equilibrium: shortage · price rises

At equilibrium: no pressure either way

Where the price is free to move, surpluses and shortages are short-lived

Question

A shortage that *lasts*: concert tickets at face value · campus parking.
What keeps the price from moving?

Equilibrium from equations

$$Q_d = 1200 - 50P \quad Q_s = 200 + 50P$$

Equilibrium from equations

$$Q_d = 1200 - 50P \quad Q_s = 200 + 50P$$

1. Set $Q_d = Q_s$

$$1200 - 50P = 200 + 50P$$

Equilibrium from equations

$$Q_d = 1200 - 50P \quad Q_s = 200 + 50P$$

1. Set $Q_d = Q_s$

$$1200 - 50P = 200 + 50P$$

2. Solve

$$1000 = 100P \cdot P^* = 10$$

Equilibrium from equations

$$Q_d = 1200 - 50P \quad Q_s = 200 + 50P$$

1. Set $Q_d = Q_s$

$$1200 - 50P = 200 + 50P$$

2. Solve

$$1000 = 100P \cdot P^* = 10$$

3. Substitute

$$Q^* = 1200 - 50(10) = 700$$

Equilibrium from equations

$$Q_d = 1200 - 50P \quad Q_s = 200 + 50P$$

1. Set $Q_d = Q_s$

$$1200 - 50P = 200 + 50P$$

2. Solve

$$1000 = 100P \cdot P^* = 10$$

3. Substitute

$$Q^* = 1200 - 50(10) = 700$$

4. Check with the other equation

$$200 + 50(10) = 700 \checkmark$$

Equilibrium from equations

$$Q_d = 1200 - 50P \quad Q_s = 200 + 50P$$

1. Set $Q_d = Q_s$

$$1200 - 50P = 200 + 50P$$

2. Solve

$$1000 = 100P \cdot P^* = 10$$

3. Substitute

$$Q^* = 1200 - 50(10) = 700$$

4. Check with the other equation

$$200 + 50(10) = 700 \checkmark$$

Same method on the schedule: $50 - P = 1.5P \cdot P^* = 20, Q^* = 30$

Question

$$Q_d = 1200 - 50P \text{ and } Q_s = 200 + 50P$$

- (a) Surplus or shortage at $P = 14$?
- (b) Income rises: demand becomes $Q_d = 1500 - 50P$. New equilibrium?
- (c) At the old price of \$10, what does the market look like right after the shift?

Try it

Question

$$Q_d = 1200 - 50P \text{ and } Q_s = 200 + 50P$$

- (a) Surplus or shortage at $P = 14$?
- (b) Income rises: demand becomes $Q_d = 1500 - 50P$. New equilibrium?
- (c) At the old price of \$10, what does the market look like right after the shift?

(a) $Q_d = 500$, $Q_s = 900$ · surplus of 400

Try it

Question

$$Q_d = 1200 - 50P \text{ and } Q_s = 200 + 50P$$

- (a) Surplus or shortage at $P = 14$?
- (b) Income rises: demand becomes $Q_d = 1500 - 50P$. New equilibrium?
- (c) At the old price of \$10, what does the market look like right after the shift?

(a) $Q_d = 500$, $Q_s = 900$ · surplus of 400

(b) $1300 = 100P$ · $P^* = 13$, $Q^* = 850$

Try it

Question

$$Q_d = 1200 - 50P \text{ and } Q_s = 200 + 50P$$

- (a) Surplus or shortage at $P = 14$?
- (b) Income rises: demand becomes $Q_d = 1500 - 50P$. New equilibrium?
- (c) At the old price of \$10, what does the market look like right after the shift?

(a) $Q_d = 500$, $Q_s = 900$ · surplus of 400

(b) $1300 = 100P$ · $P^* = 13$, $Q^* = 850$

(c) $Q_d = 1000$, $Q_s = 700$ · shortage of 300 · this is what pushes the price from 10 to 13

Three steps for any change

1. Which curve: demand, supply, or both?
2. Which way: right or left?
3. Draw it · compare the new equilibrium with the old · what happened to P and Q ?

Three steps for any change

1. Which curve: demand, supply, or both?
2. Which way: right or left?
3. Draw it · compare the new equilibrium with the old · what happened to P and Q ?

Step 1 is where mistakes happen

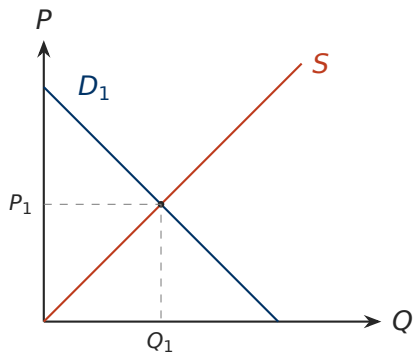
Does the event change what buyers *want* at a given price?

→ demand

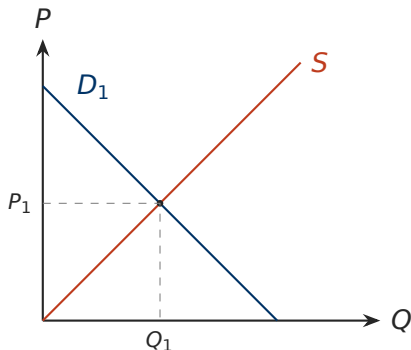
Does it change what it *costs* to sell at a given price?

→ supply

Electric cars, A: the price of oil rises

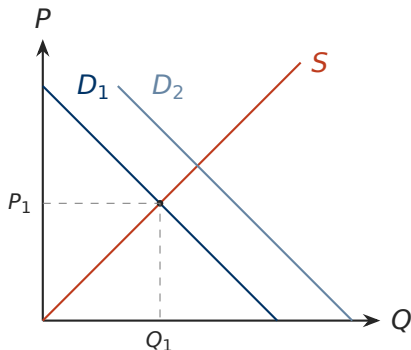


Electric cars, A: the price of oil rises



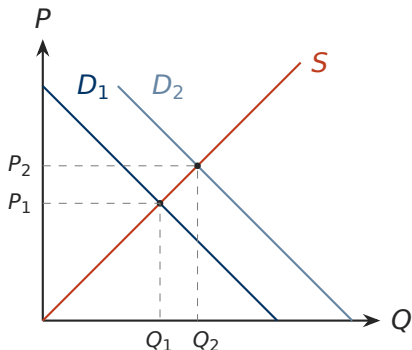
1. Gasoline cars, a **substitute**, got costlier to run · demand
Nothing changed about building an electric car

Electric cars, A: the price of oil rises



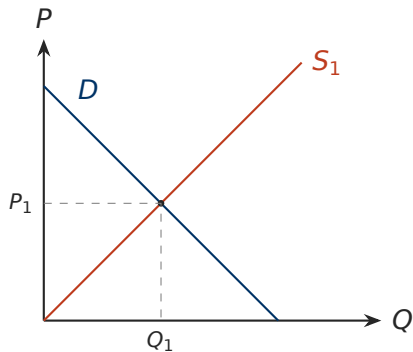
1. Gasoline cars, a **substitute**, got costlier to run · demand
Nothing changed about building an electric car
2. Demand shifts **right**

Electric cars, A: the price of oil rises

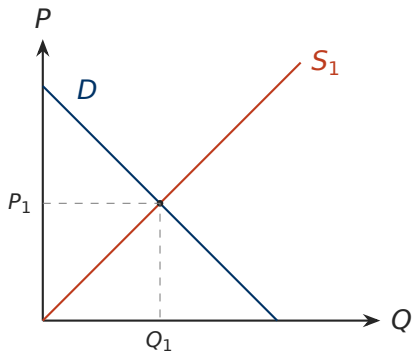


1. Gasoline cars, a **substitute**, got costlier to run · demand
Nothing changed about building an electric car
2. Demand shifts **right**
3. Shortage at P_1 · price bid up
 P up, Q up

Electric cars, B: engine technology improves

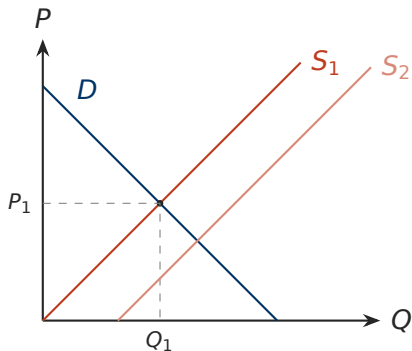


Electric cars, B: engine technology improves



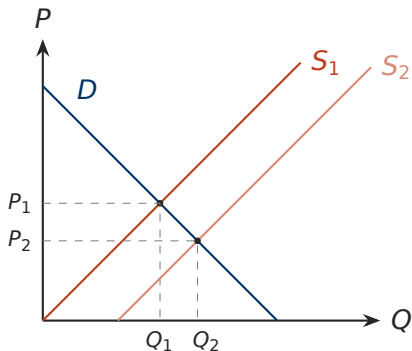
1. Lower production **cost** · supply

Electric cars, B: engine technology improves



1. Lower production **cost** · supply
2. Supply shifts **right**

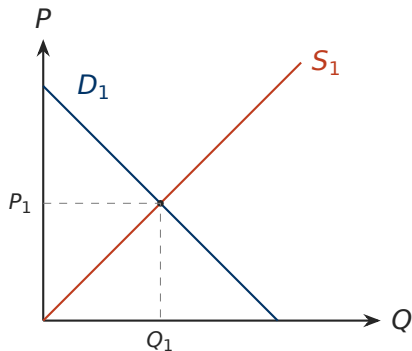
Electric cars, B: engine technology improves



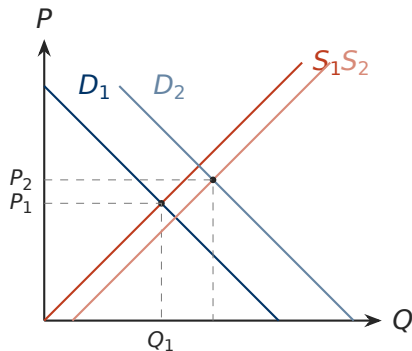
1. Lower production **cost** · supply
2. Supply shifts **right**
3. Surplus at P_1 · price falls
 P down, Q up

Electric cars, C: both at once

Both curves shift, both **right**



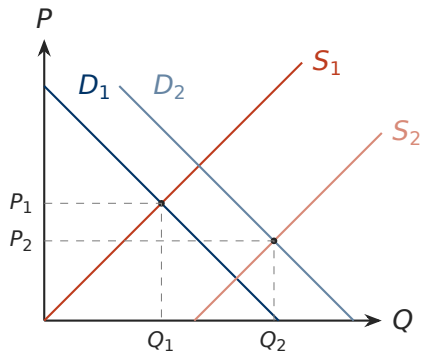
Electric cars, C: both at once



Both curves shift, both **right**

Small supply shift: P **rises**

Electric cars, C: both at once

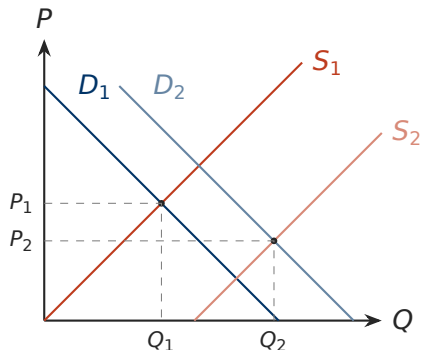


Both curves shift, both **right**

Small supply shift: P **ris**es

Large supply shift: P **fall**s

Electric cars, C: both at once



Both curves shift, both **right**

Small supply shift: P **rises**

Large supply shift: P **falls**

Conclusion

Q up for sure · P **ambiguous**:
depends on which shift is larger,
and the question does not say

All nine cases

	S unchanged	S increases	S decreases
D unchanged	P same, Q same	$P \downarrow, Q \uparrow$	$P \uparrow, Q \downarrow$
D increases	$P \uparrow, Q \uparrow$	$P ?, Q \uparrow$	$P \uparrow, Q ?$
D decreases	$P \downarrow, Q \downarrow$	$P \downarrow, Q ?$	$P ?, Q \downarrow$

One curve shifts: P and Q both determined

Both shift: one determined, the other **ambiguous** unless the sizes are given

Do not memorize the table · draw the picture

A real one: eggs

Dozen large eggs	U.S. avg.
------------------	-----------

Jan 2022	\$1.93
----------	--------

Jan 2023	\$4.82
----------	--------

Mar 2025	\$6.23
----------	--------

BLS average price data; USDA APHIS

Avian flu, 2022: over 40
million laying hens lost

Again in late 2024 and early
2025

Question

Three steps. Which curve, which way,
what happens to P and Q ?

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1. Fewer hens · costs sellers, not
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Three steps. Which curve, which way, what happens to P and Q ?

1. Fewer hens · costs sellers, not buyers · **supply**
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A real one: eggs

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BLS average price data; USDA APHIS

Avian flu, 2022: over 40

million laying hens lost

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2025

Question

Three steps. Which curve, which way, what happens to P and Q ?

1. Fewer hens · costs sellers, not buyers · **supply**
2. Supply shifts **left**
3. Shortage at the old price · price bid up · **P up, Q down**

Nobody ordered a price of \$6 · the shortage did it

Which curve? The statement tells you

Question

Draw the shift and name the shifter

- (a) “When there is an influx of immigrants, the price of healthcare rises”
- (b) “When the price of electric cars is expected to rise soon, the current price rises”

Which curve? The statement tells you

Question

Draw the shift and name the shifter

- (a) “When there is an influx of immigrants, the price of healthcare rises”
- (b) “When the price of electric cars is expected to rise soon, the current price rises”

(a) More buyers · demand right · P up, Q up

Which curve? The statement tells you

Question

Draw the shift and name the shifter

(a) “When there is an influx of immigrants, the price of healthcare rises”

(b) “When the price of electric cars is expected to rise soon, the current price rises”

(a) More buyers · demand right · P up, Q up

(b) Buyers expecting a higher price buy now · demand right

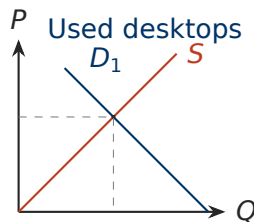
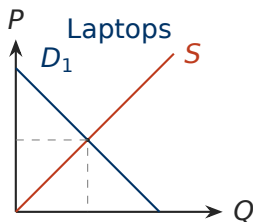
Sellers expecting a higher price hold back · supply left

Either raises today's price · together: P up, Q **ambiguous**

Two markets at once

Question

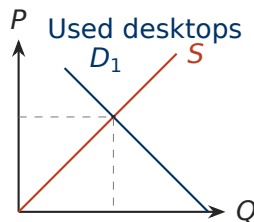
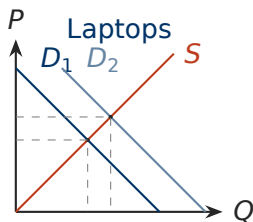
"A technological advance improves the features of laptops. The price of laptops rises and the price of used desktops falls." Show both markets.



Two markets at once

Question

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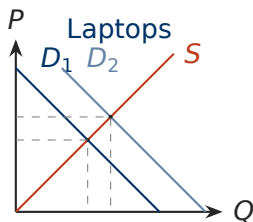


Tastes · demand right · P up
A cost cut would be supply right, P
down

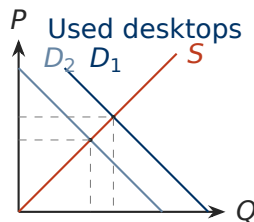
Two markets at once

Question

"A technological advance improves the features of laptops. The price of laptops rises and the price of used desktops falls." Show both markets.



Tastes · demand right · P up
A cost cut would be supply right, P down



A **substitute** got better · demand left · P down

Exam-style scenarios

Question

What happens to equilibrium P and Q ?

- (a) A hurricane destroys the Hudson Valley apple crop · apples
- (b) Mercury is found in fish; the same month, diesel gets cheaper · fish
- (c) Honey and jam are substitutes; the price of honey rises · jam, then honey

Exam-style scenarios

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(a) Supply **left** · P up, Q down · Hurricane Irene, 2011

Exam-style scenarios

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- (a) Supply **left** · P up, Q down · Hurricane Irene, 2011
- (b) Demand left, supply right · both push P **down** · Q **ambiguous**

Exam-style scenarios

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- (a) Supply **left** · P up, Q down · Hurricane Irene, 2011
- (b) Demand left, supply right · both push P **down** · Q **ambiguous**
- (c) Jam: demand right, P and Q up · Honey: own price, **move along**

How prices allocate resources

Nobody decides how many eggs get sold, or who gets them · the **price** does

Supply falls: the higher price rations eggs to the buyers who value them most, and tells farmers to rebuild flocks

Costs fall: the lower price passes the gain to buyers

Principle 6 at work · later chapters: when it **fails**

Hayek, “The Use of Knowledge in Society” (1945)

...one of the sources of supply of tin has been eliminated. ... The marvel is that ... without an order being issued, without more than perhaps a handful of people knowing the cause, tens of thousands of people ... are made to use the material or its products more sparingly.

Summary

The curves

- Demand slopes down · shifts with buyers, income, related prices, tastes, expectations
- Supply slopes up · shifts with input prices, technology, sellers, expectations
- Own price: move along · anything else: shift · increase means right
- Market curve: add the individual curves horizontally

The price

- Equilibrium: $Q_d = Q_s$ · solve by setting the equations equal
- Above it a surplus pushes P down · below it a shortage pushes P up
- Three steps: which curve, which way, compare equilibria
- One shift: P and Q determined · two shifts: one of them ambiguous

Next: Ch 5, Elasticity.

MindTap: Ch 4 homework due Sunday, 11 PM.