

Chapter 3

Model of a Competitive Market

Demand and Supply



Competitive market = a market in which there are many buyers and sellers of the same good.
Examples: **wood, copper, rice, apples**



Demand Curve

Demand = how much of a good or service people want to buy



- The **model of demand** illustrates how a change in price affects the quantity of a good demanded, *ceteris paribus*.

Remember that simplified models measure only one change at a time.

Therefore, a model of demand for a good assumes that the price is the only variable that changes.

- **Key assumption:** there is no change in income, preferences, or other variables.
- These variables are held constant.

Modeling Demand

Start with a table of different quantities demanded at different prices = demand schedule.

Example: Demand schedule for hot chocolate

Price per Cup Quantity Demanded

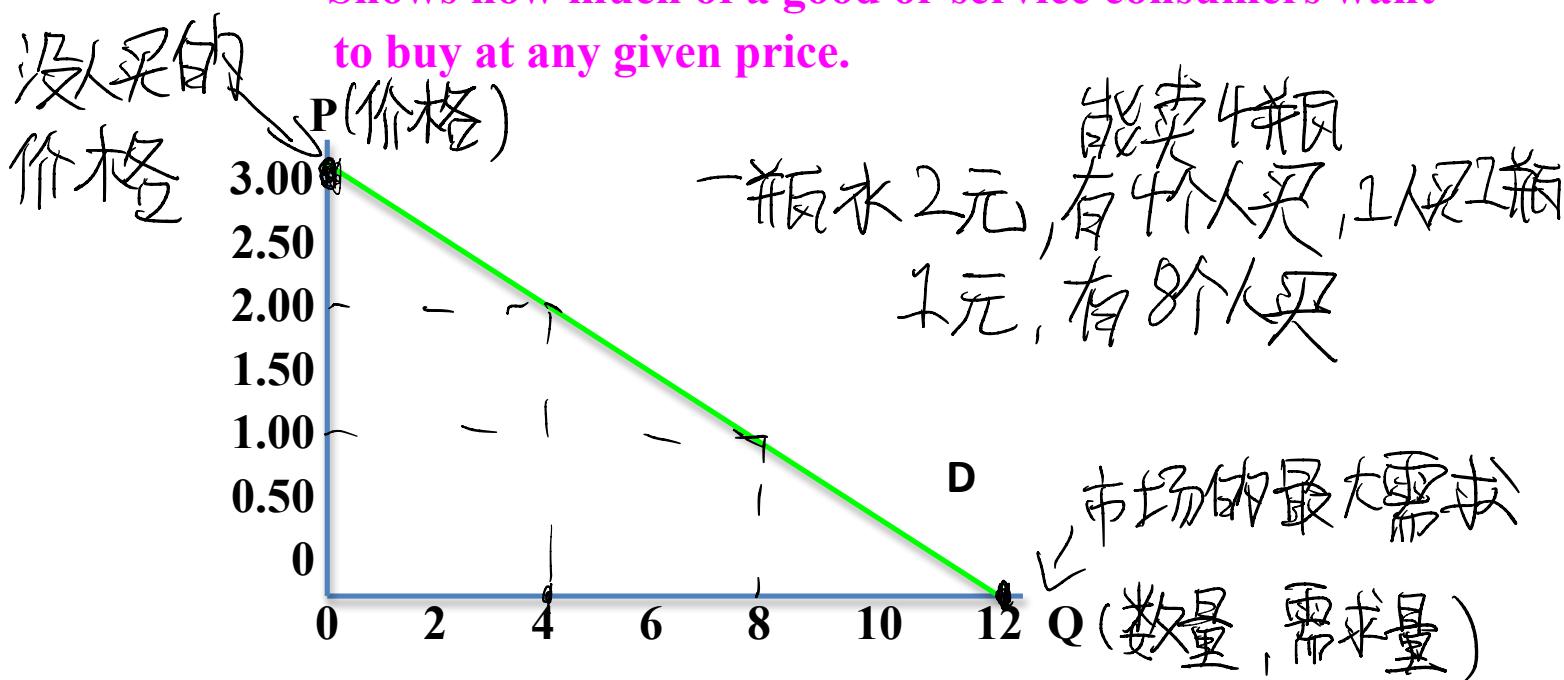
\$0	12
\$0.50	10
\$1.00	8
\$1.50	6
\$2.00	4
\$2.50	2
\$3.00	0



The price and quantity demanded, Q_D , are

The demand curve is a graph of the demand schedule.

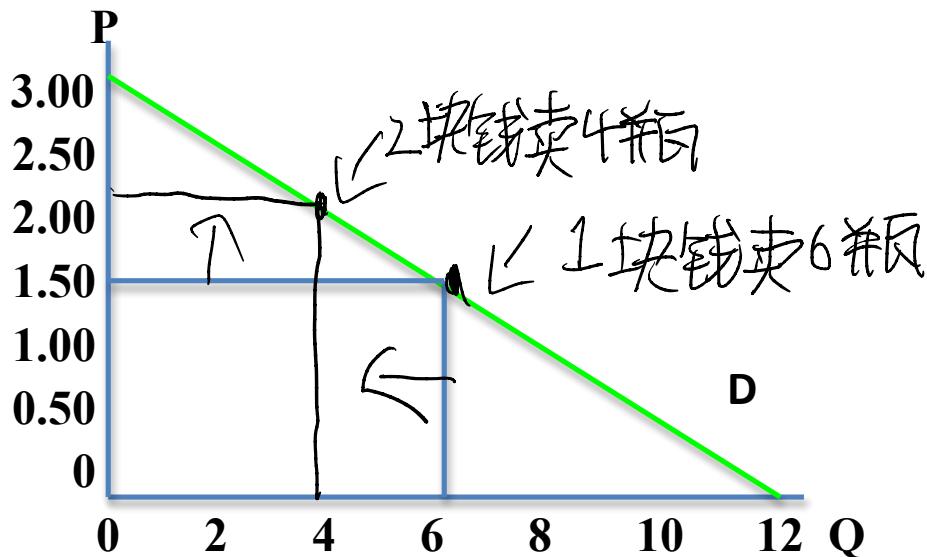
- Shows how much of a good or service consumers want to buy at any given price.



Law of Demand = all other things equal, Q^D decreases when price increases and vice versa.

A change in the price will cause a movement along the demand curve and a change in the quantity demanded (Q^d).

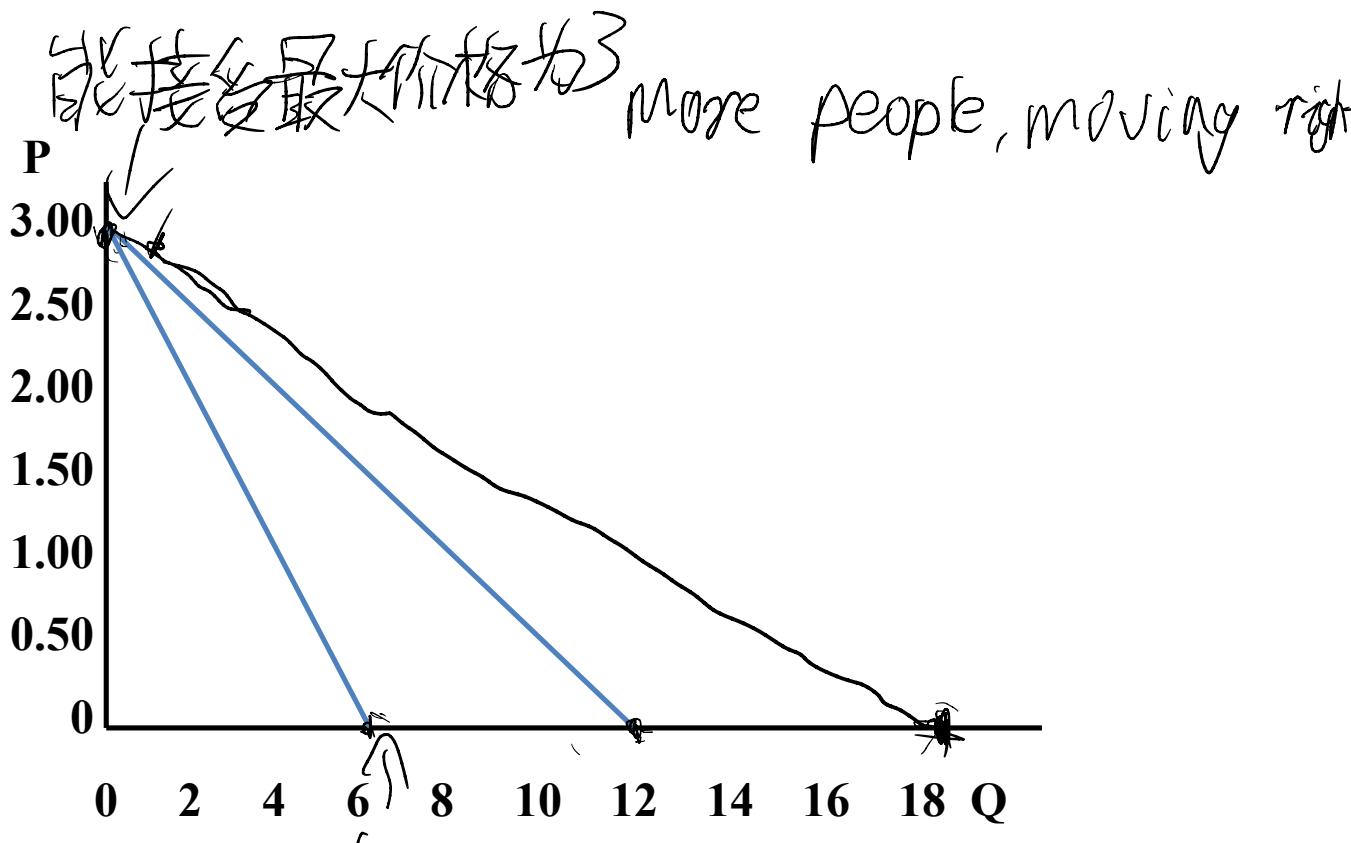
Example: If the price increases from \$1.50 to \$2.00 the quantity demanded will decrease from 6 to 4.



Creating the Market Demand for Hot Chocolate

The market demand curve shows the aggregate quantity demanded at each price.

Price	Matthew	Michelle	Market Demand
\$0	12	6	18
\$0.50	10	5	15
\$1.00	8	4	12
\$1.50	6	3	9
\$2.00	4	2	6
\$2.50	2	1	3
\$3.00	0	0	0



When variables *other than the price* change there will be a change in the quantity demanded at any price →

the demand curve will shift.

Why would the demand curve shift? Why would you buy more or less of a good at the same price?

- * Change in income
- * Change in preferences or necessity
- * Change in population
- * Change in expectations about the future
- * Change in prices of substitute or complementary goods

Variables that shift the demand curve:

1. Change in prices of related goods.

Related goods can be substitutes or complements.

- Complements = goods that are consumed together

E.g. vehicles and gas, popcorn and movies, staples and staplers



- Substitutes = other similar goods 海飞丝, 飘柔 people are willing to consume instead.

E.g. coffee or tea, rice or potatoes



Two goods are *substitutes* if a rise in the price of one good

increases demand for the other good, or vice versa.

Two goods are *complements* if a rise in the price of one good

decreases demand for the other good, or vice versa.

With complements consumers consider the total price of both goods.

2. Change in Income

More income means consumers *can* buy more, but do they want to?

- Normal goods = when income increases, demand increases, or vice versa.

Examples: New cars, Prada bags, nice restaurant meals



- Inferior goods = when income increases, demand decreases, or vice versa.

Examples: Used cars, Walmart clothes, fake Prada bags, instant noodles

3. Change in tastes/preferences

Fashions and increases in knowledge change consumers' demand for certain goods.

E.g.: “acid washed” jeans and big hair in the 1980s



Yes this was COOL!

E.g. Knowledge the dangers of smoking.



Many decades ago...

4. Change in population

- With more people demand will increase, assuming the extra people have the same tastes and income as the existing population.

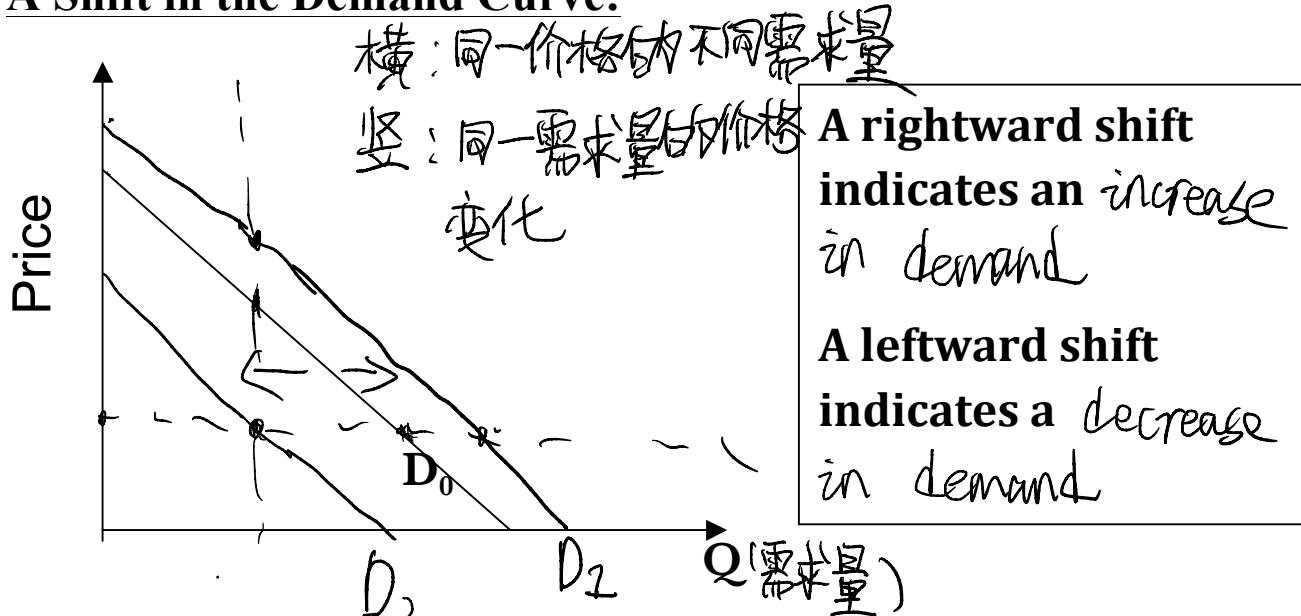
5. Change in expectations about the future

The *expected* future value of goods might change.

- E.g. A famous singer or athlete announces retirement, so consumers are willing to pay more to see them one last time.
- E.g. If people expect house prices to increase in the future demand *today* will **increase**, and vice versa.



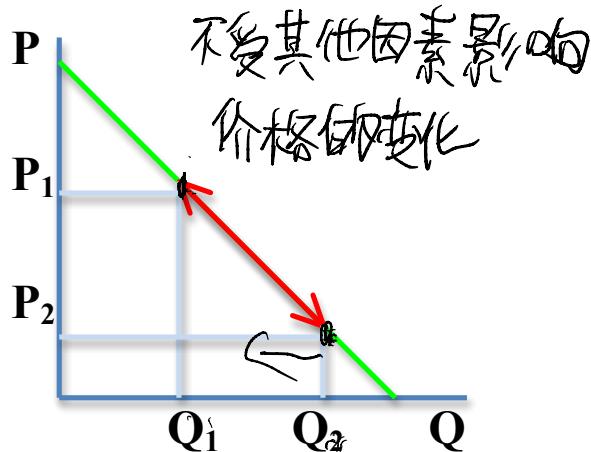
A Shift in the Demand Curve:



Change in Demand or a Change in Quantity Demanded?

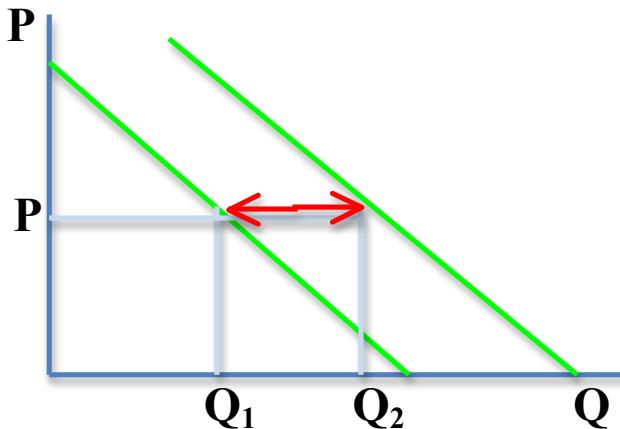
A change in quantity demanded refers to a movement along the curve

A change in demand refers to a shift of the curve



Change in quantity demanded

Cause: Change in price

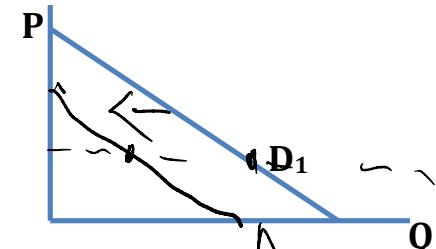


Change in demand

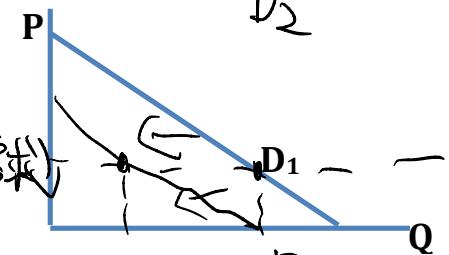
Cause: Change in income, preferences, prices of related goods, expectations, or population.

Exercise 1: What will happen to demand for banana milkshakes in each of the following cases? Show the effect on the diagram.

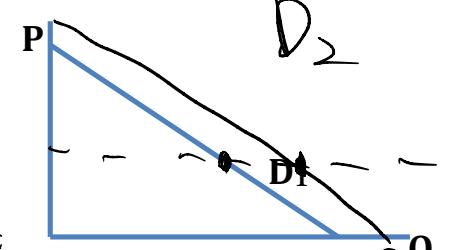
1. Banana milkshakes are a normal good and incomes decrease.



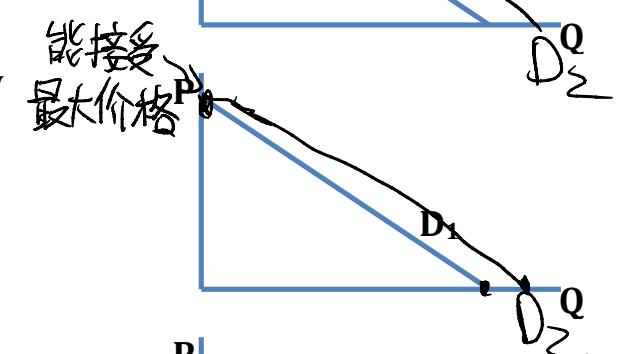
2. Peanut butter cookies are a complement for banana milkshakes and the price of peanut butter cookies increases. 饼干价格↑ 香蕉需求↓
饼干需求↓



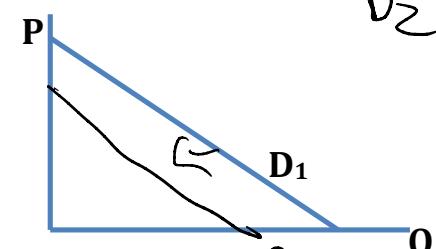
3. Strawberry milkshakes are a substitute for banana milkshakes and the price of strawberries increases. 草莓价格↑ 香蕉需求↓
草莓需求↓



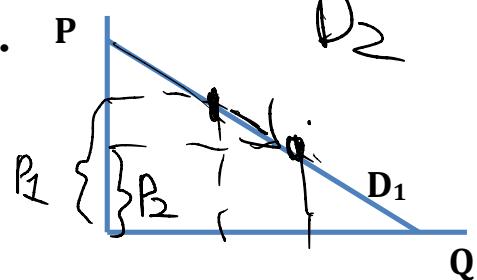
4. The population increases and the new people have a similar preference for banana milkshakes as the existing population.



5. Consumers expect the price of banana milkshakes to decrease next month.

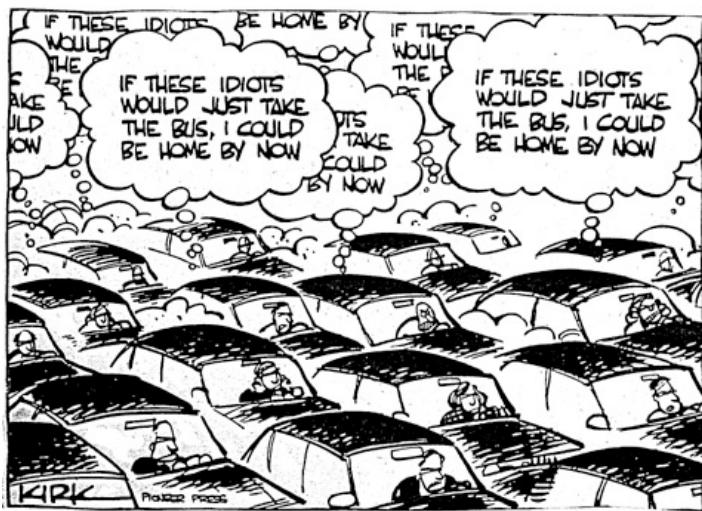


6. The price of banana milkshakes decreases.



Policy Application

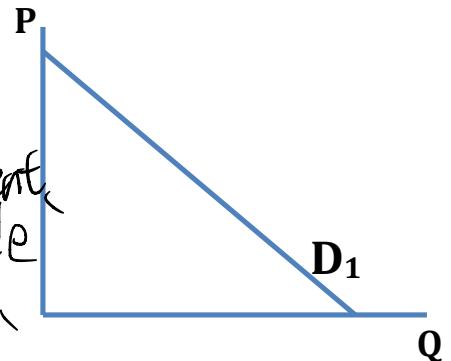
Driving: Using the model of demand to control *traffic congestion and air pollution.*



To decrease demand for driving policies could:

1. Lower the price of substitutes

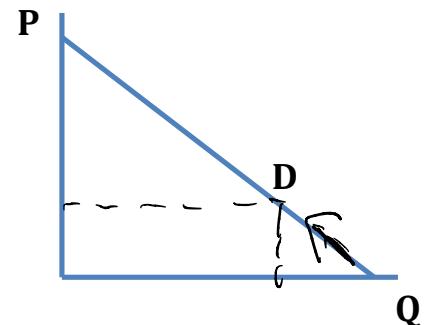
- Subsidizing transit, making transit safer, cleaner, and more convenient
- Make it easier for people to ride bicycles or walk



2. Increase the price of complements

- Increase gas taxes, parking rates

To decrease quantity demanded for driving policies could increase the “price” of driving by charging road tolls.

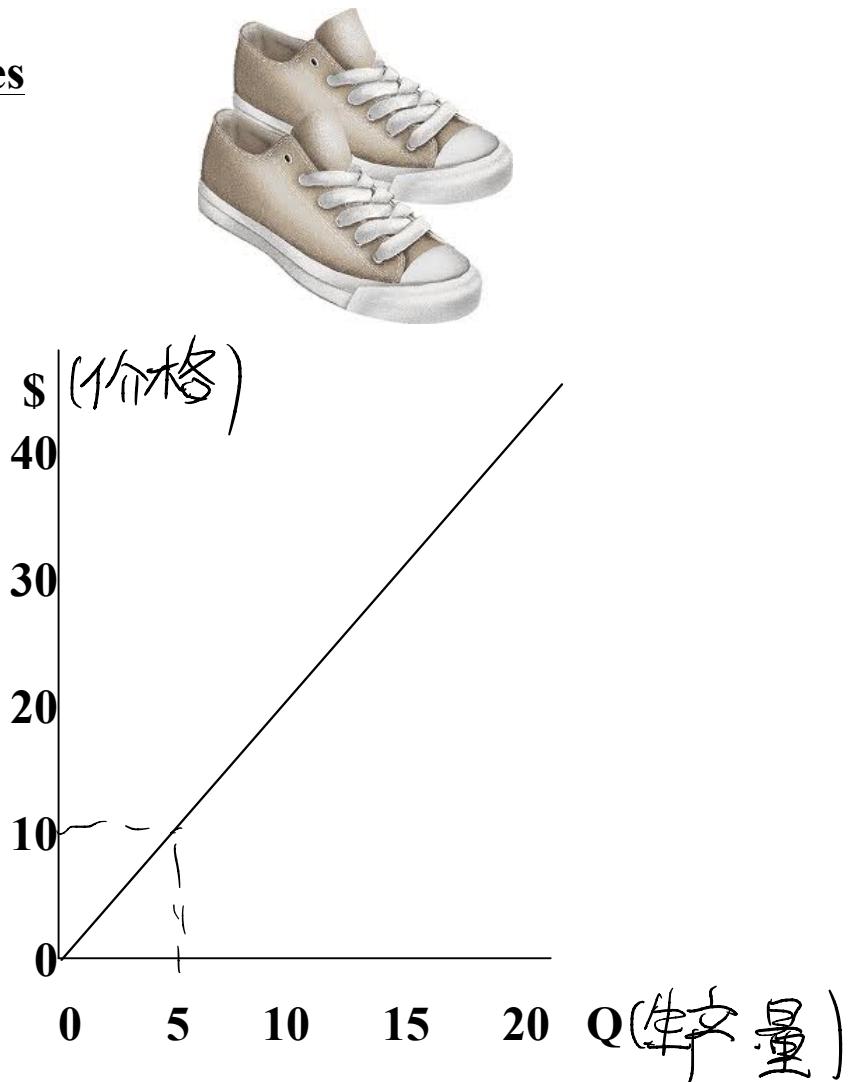


The Supply Curve

Illustrates the quantity supplied, or the quantity producers are willing to sell, at any given price.

Supply Schedule for Shoes

Price	Q^S
\$0	0
\$10	5
\$20	10
\$30	15
\$40	20

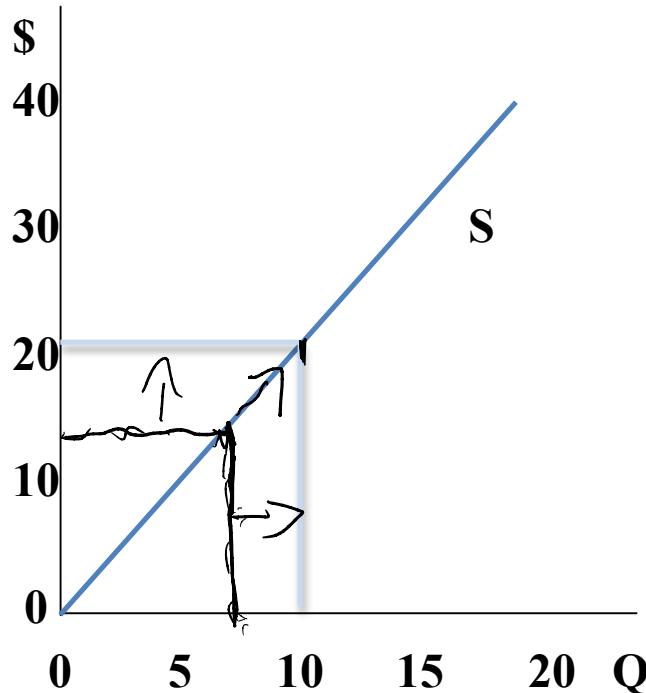


Firms want to sell more at higher prices because their profits are higher, so price and quantity supplied are positively related.

Law of supply: all other things equal, the quantity supplied increases as price increases, and vice versa.

A change in the price will cause a movement along the supply curve and a change in the quantity supplied.

Example: If the price increases from \$20 to \$30 the quantity supplied will increase from 10 to 15.



The supply curve will *shift* if variables other than the price change and affect the quantity suppliers would like to sell at any given price.

1. Changes in input prices (e.g. labour, supplies)
If input prices increase, costs of production increase, and producers will supply less, or vice versa.
2. Changes in technology
Better technology increases productivity, thereby lowering costs. Producers will supply more.

3. Changes in number of suppliers

More suppliers of the same good will increase supply.

4. Changes in expectation to future prices

If prices are expected to increase in the future suppliers will decrease their supply today and wait to sell their goods in the future, or vice versa.

5. Changes in current events

Bad weather, natural disasters, or wars will decrease supply of agricultural goods.

6. Changes in the price of a complement or substitute in production

- *Substitutes in production:* when a producer can use the same set of inputs to produce two different goods.
E.g. A farmer can produce carrots or beets: substitutes
If the price of carrots increases the supply of beets will decrease

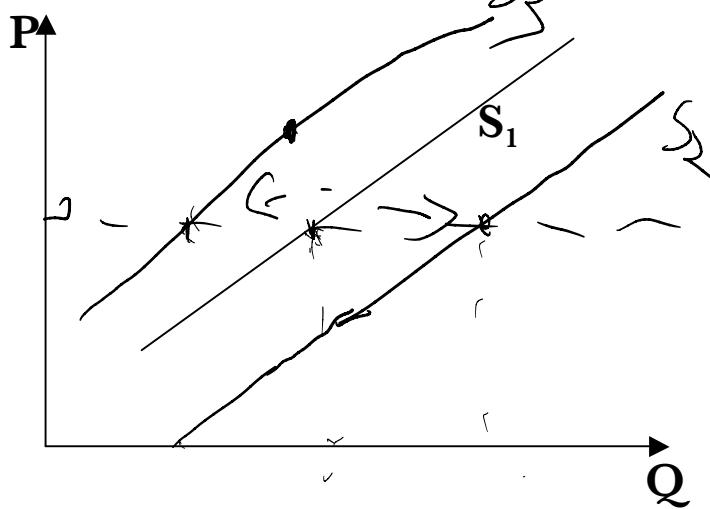


牛蒡 → 18日
→ 黄油

- *Complements in production:* when there is a by-product of production.
E.g. Farmers can sell beet greens or beet roots: complements

If the price of beet leaves increases the supply of beet roots will increase

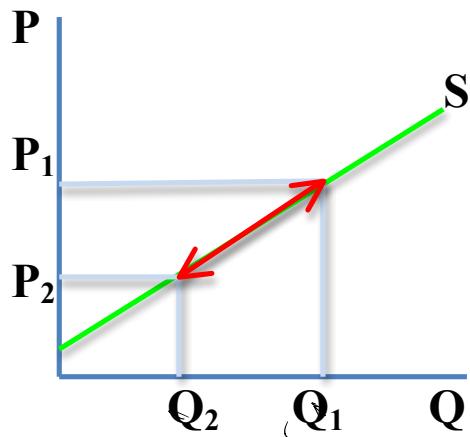
A Shift in the Supply Curve:



A rightward shift indicates an increase in supply
A leftward shift indicates a decrease in supply

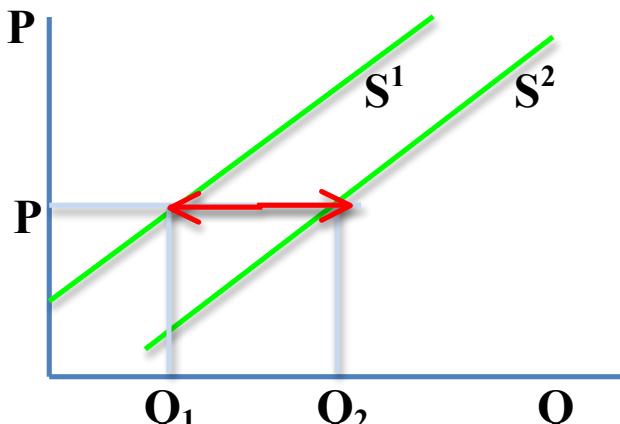
Change in Supply or a Change in Quantity Supplied?

A change in quantity supplied refers to a movement along the curve.
A change in supply refers to a shift of the curve.



Change in quantity supplied

Cause: Change in price

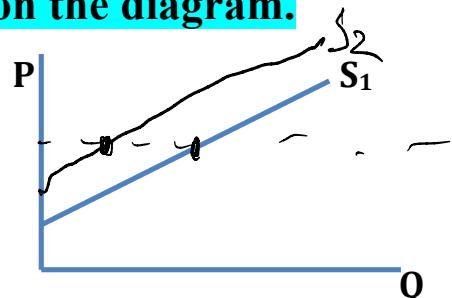


Change in supply

Cause: Change in input prices, technology, number of suppliers, expectations, current events, and prices of related goods.

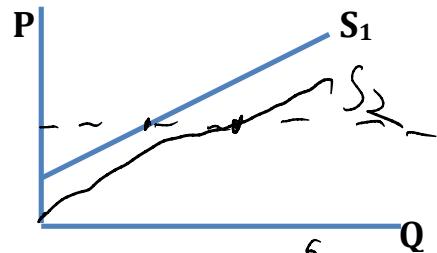
Exercise 2: What will happen to supply for banana milkshakes in each of the following cases? Show the effect on the diagram.

1. The number of producers decreases.



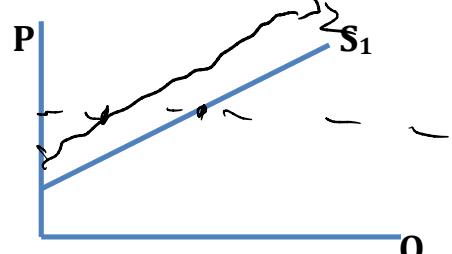
2. A new more powerful milkshake making machine is purchased by producers.

科技 \nearrow 利润 \nearrow
 成本 \downarrow 生产 \nearrow



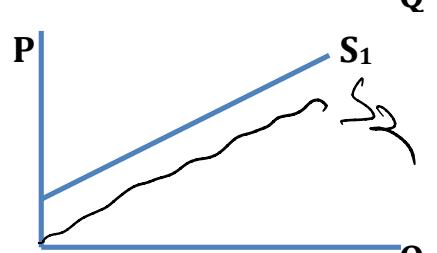
3. Banana muffins are a substitute in production for banana milkshakes and the price of banana muffins increases.

麦芬价格 \nearrow 麦芬生产 \nearrow
 麦芬利润 \nearrow 奶昔生产 \downarrow



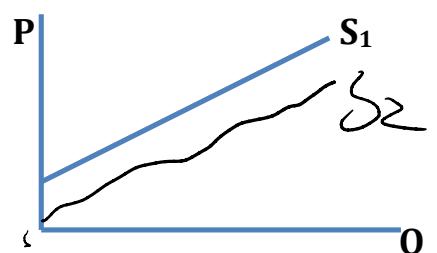
4. A stronger Canadian dollar makes bananas cheaper.

成本 \downarrow
 利润 \nearrow
 生产 \nearrow

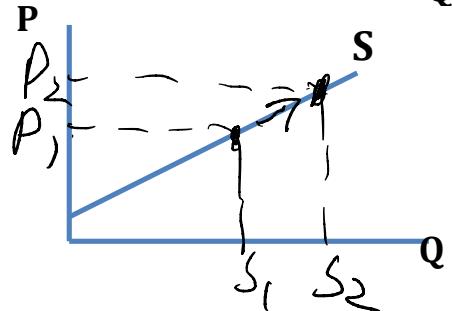


5. Producers expect the price of banana milkshakes to decrease next month.

下降价 \downarrow



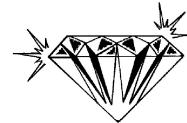
6. The price of banana milkshakes increases.



Equilibrium Price and Quantity

What determines the price of an item?

- How much is there? *Supply*
- How much do people want it? *Demand*



Prices are highest for items with a
small supply and/or large demand
E.g. Diamonds



Prices are lowest for items with a
large supply and/or small demand
E.g. Potatoes

Principle #6: markets move toward equilibrium.

What would happen if there were a *shortage* in a market?

The price would *increase*

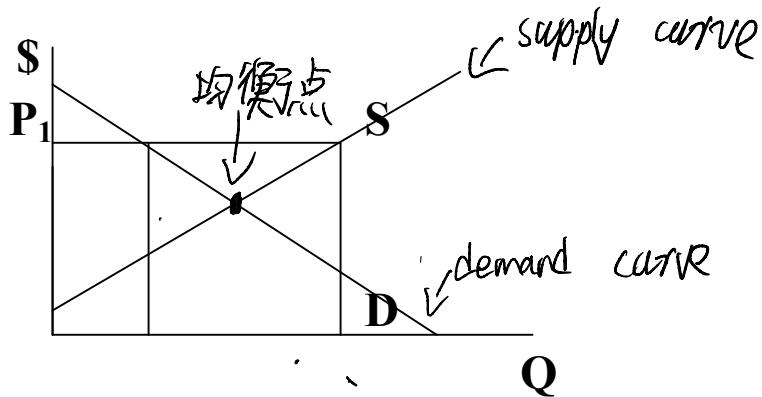
What would happen if there were a *surplus* in a market?

The price would *decrease*

Establishing a market equilibrium:

If the price is too high:

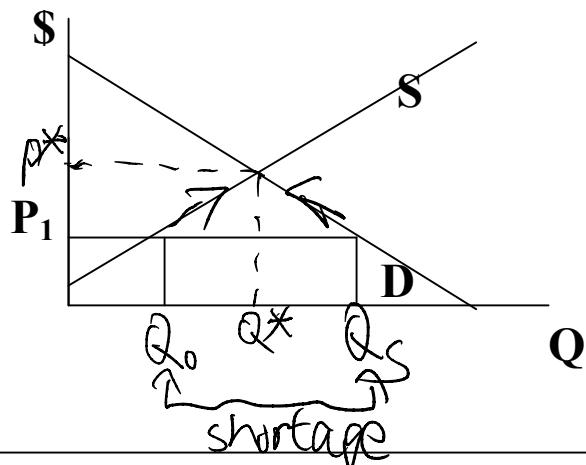
价格高, 供>求



If $Q^S > Q^D$ sellers will have to lower their price to sell the excess →

Movement down along S and D curves until surplus disappears

If the price is too low:



If $Q^D > Q^S$ sellers will keep increasing their price as long as they can continue to sell everything →

Movement up along S and D curves until shortage disappears

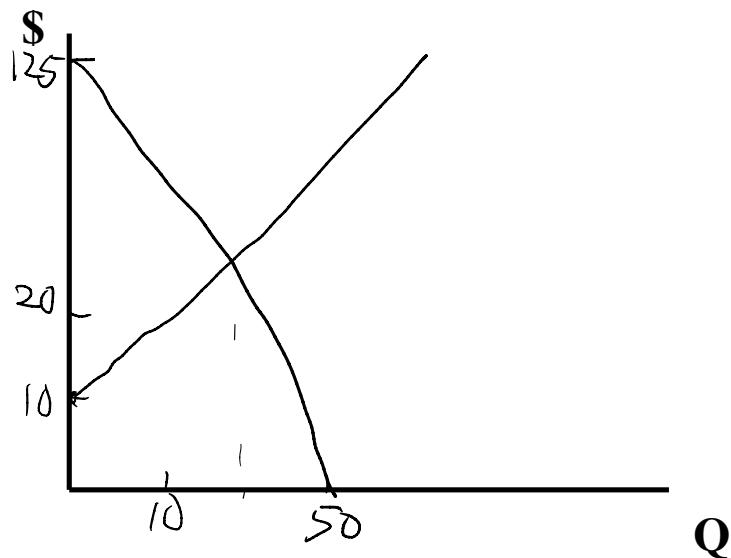
Equilibrium: When $Q^S = Q^D$
The equilibrium is at P^* , Q^*

Example with Equations:

$$\text{Demand: } P = 50 - 0.4Q$$

$$\text{Supply: } P = 10 + 0.1Q$$

Graph the equations:



Calculate the equilibrium price and quantity:

$$50 - 0.4Q = 10 + 0.1Q$$

$$40 = 0.5Q$$

$$Q = 80$$

$$P: 10 + 8 = 18$$

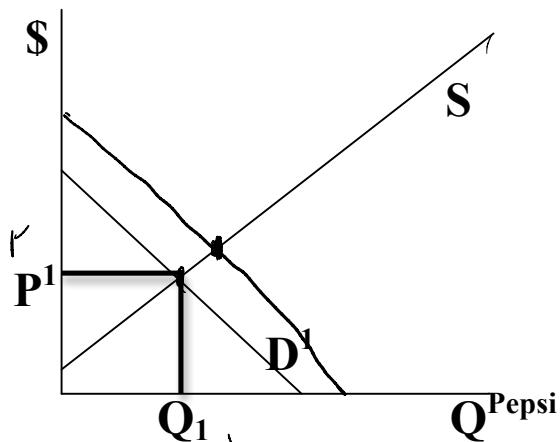
What will happen if $P = 15$?

The demand goes up, the price of supply goes up, market produces more goods

Shortage 37.5

What happens when the curves shift?

Example 1: Suppose the price of Coke increases. What will happen in the Pepsi market?



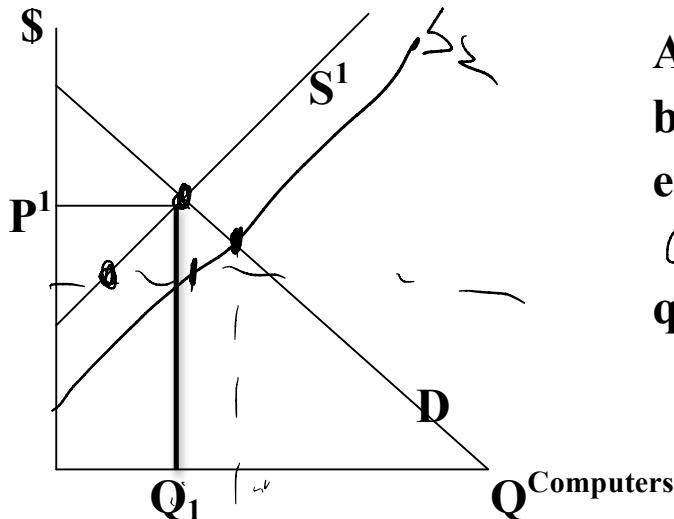
At P^1 there is a *shortage* because $Q^D > Q^S$.

The equilibrium price and quantity will both increase

There is an increase in demand.

There is an increase in quantity supplied.

Example 2: A new machine decreases labour time (and labour costs) required to produce computers.



At P^1 there is a *surplus* because $Q^D < Q^S$, so the equilibrium price will decrease and the equilibrium quantity will increase

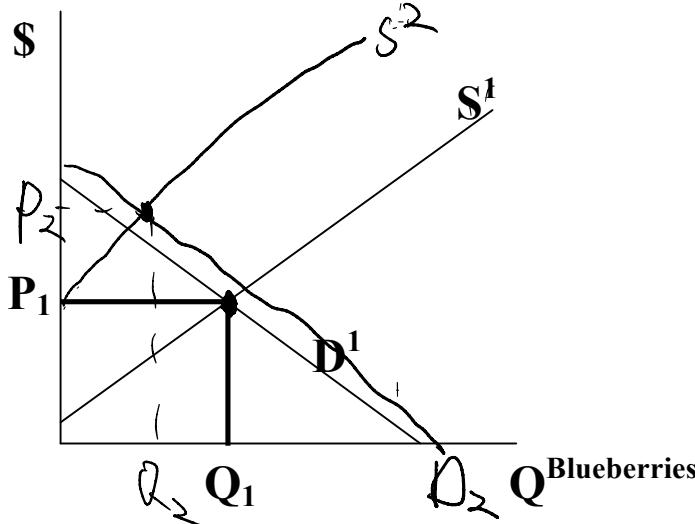
There is an increase in supply

There is an increase in quantity demand

Example 3: A report is released about the health benefits of blueberries the same summer that a heat wave damages the blueberry crops.

There is a decrease in supply

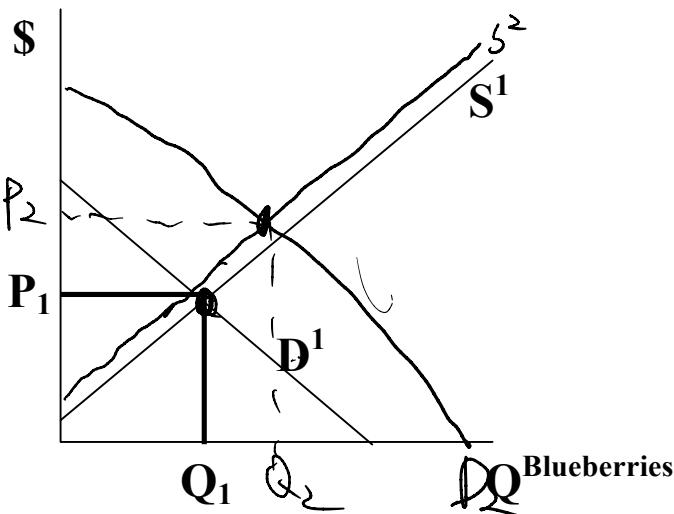
There is an increase in demand



Supply shifts more than demand.

Price ↓

Quantity ↘



Demand shifts more than supply.

Price ↓

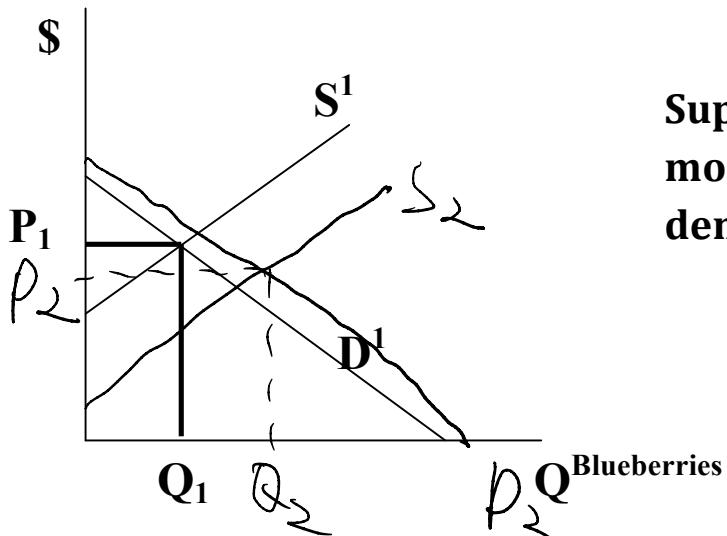
Quantity ↗

P increases for sure, but the change in Q is ambiguous
 → depends on the relative sizes of the shifts of D and S.

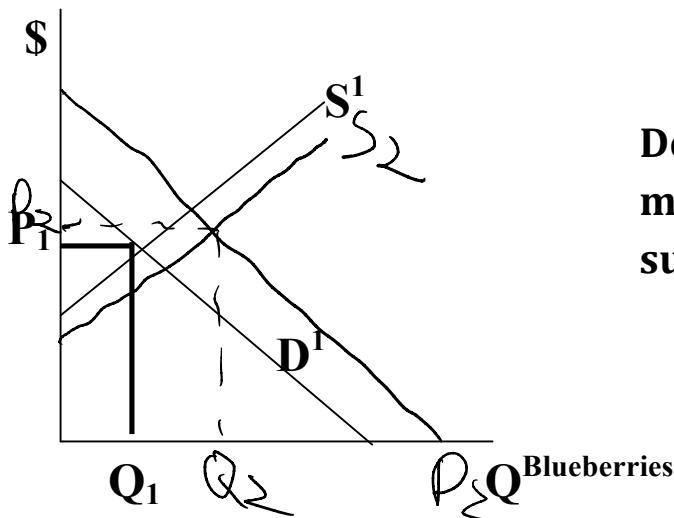
If D decreases and S increases the price decreases for sure, but the change in quantity is ambiguous

Example 4: A report is released about the health benefits of blueberries the same summer when there is a bumper crop of blueberries.

There is an increase in supply
There is an increase in demand



Supply shifts more than demand.

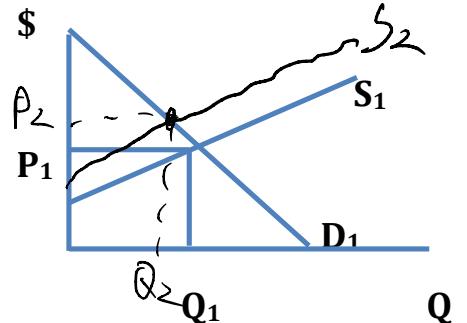


Demand shifts more than supply.

Q increases for sure, but the change in P is ambiguous
If both D and S decrease, Q decreases for sure, but the change in P is ambiguous

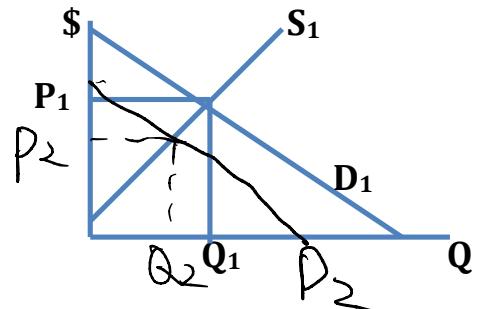
Exercise 3: Show what will happen in the market for banana milkshakes. State how you would describe the change to demand and supply.

1. Banana muffins are a substitute in production for banana milkshakes and the price of banana muffins increases.



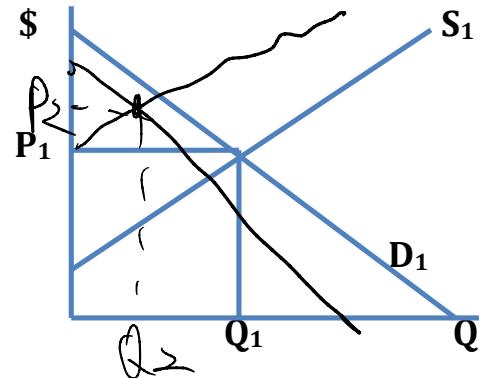
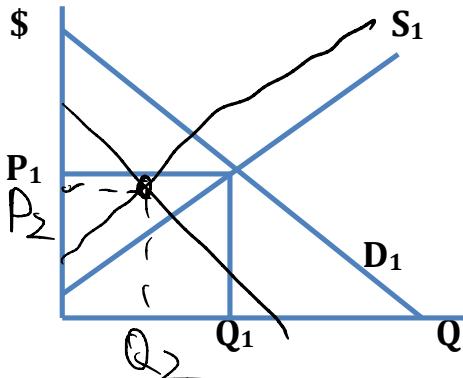
There would be a(n) decrease in supply
There would be a(n) decrease in quantity demanded

2. Banana milkshakes are a normal good and incomes decrease.



There would be a(n) decrease in demand
There would be a(n) decrease in quantity supplied

3. Banana muffins are a substitute in production for banana milkshakes and the price of banana muffins increases. At the same time banana milkshakes are a normal good and incomes decrease.

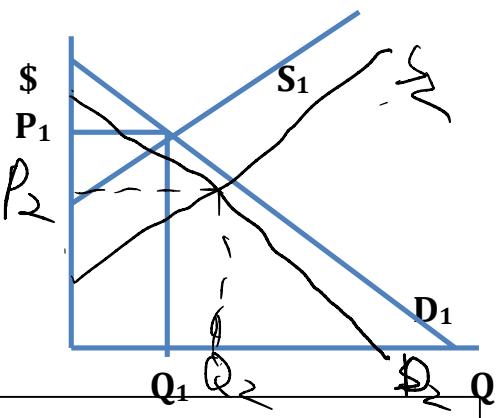
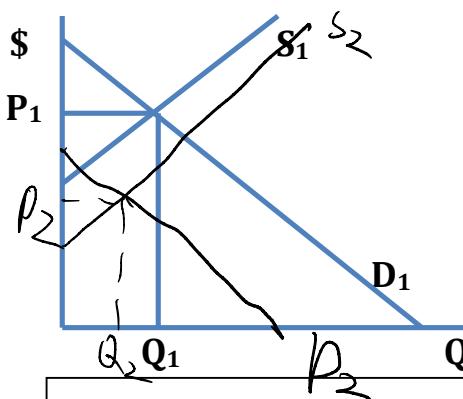


There would be a(n) decrease in demand

There would be a(n) decrease in supply

Q decreases for sure, but ΔP is ambiguous

4. A stronger Canadian dollar makes bananas cheaper. And at the same time banana milkshakes are a normal good and incomes decrease.



There would be a(n) increase in supply

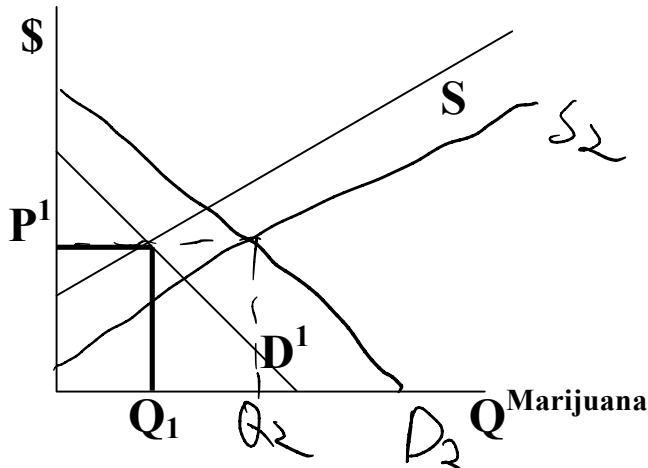
There would be a(n) decrease in demand

P decreases for sure, but ΔQ is ambiguous

Application: Marijuana and Opioids

What will happen when a country legalizes marijuana?

Both demand and supply will increase



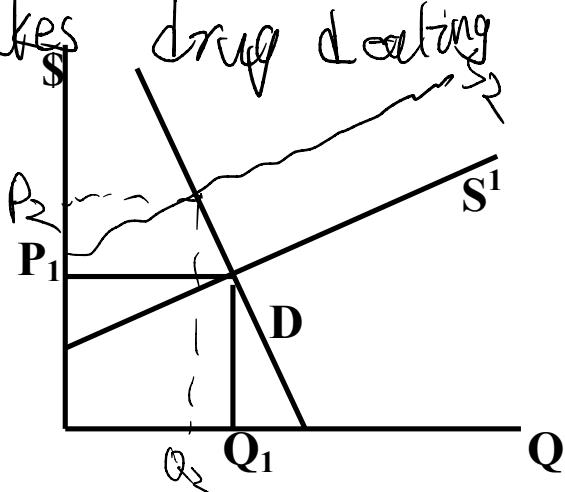
But then comes
the tax...

The Opioid Crisis

If police try to reduce drug use by catching more drug dealers and giving them more serious punishment. What happens?

Supply decreases because a higher risk of being caught makes drug dealing

more costly.



The increase in P is large, but the decrease in Q^D is small.



The demand curve for *addictive* drugs like opioids is steep because if the price increases the change in Q_D is small.

Policy needs to also target the demand curve (during users) to be effective.