Supply and Demand

Demand and supply curves

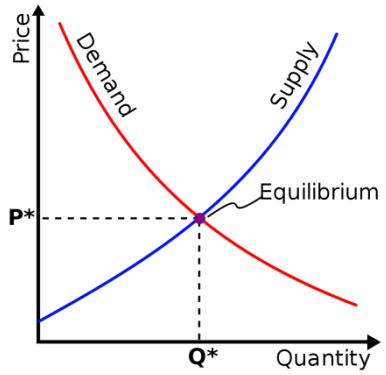
Equilibrium price and quantity

MICRO- AND MACROECONOMICS

Markets

Reminder

- A **market** is a set of arrangements by which buyers (🡐 demand) and sellers (🡐 supply) exchange goods and services.
- Markets determine prices (🡐 equilibrium p.) that ensure that the quantity people wish to buy equals the quantity people wish to sell.



Demand

- **Demand** is the quantity that buyers wish to purchase at each conceivable price.
- Demand is not a *particular* quantity, such as forty bars of chocolate (which might be the *quantity demanded* at a price of €2), but rather a full description of the quantity of chocolate buyers would purchase at each and every price that might be charged.

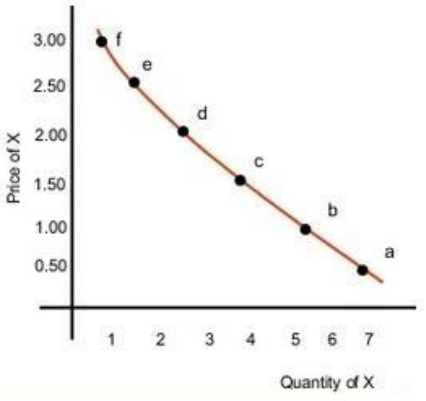
$$Q_D = f(P)$$

$$D(P): P \rightarrow Q_D$$

Demand Schedule

Point	Price [Rs per unit]	Quantity demanded of X [kg. per month]
a	0.50	7.0
b	1.00	5.0
c	1.50	3.5
d	2.00	2.5
e	2.50	1.5
f	3.00	1.0

Demand Curve



Supply

- **Supply** is the quantity of a good sellers wish to sell at each possible price.
- Supply is not a particular quantity but a complete description of the quantity that sellers want to sell at each possible price.

$$Q_S = f(P)$$

$$S(P): P \rightarrow Q_S$$

Note the distinction between *demand/supply* and *quantity demanded/supplied*:

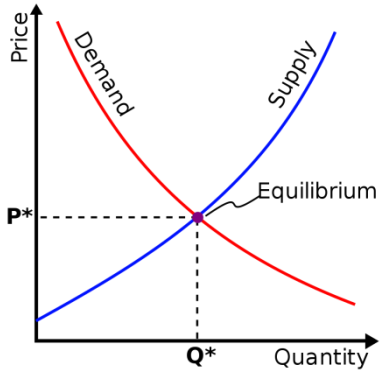
- Demand/supply describe the behaviour of buyers/sellers at *every price*.
- At a *particular price* there is a particular quantity demanded/supplied.

Example: demand and supply of chocolate

(1) Price (€/bar)	(2) Quantity demanded (no. of bars)	(3) Quantity supplied (no. of bars)
0	200	0
0.5	160	0
1	120	40
1.5	80	80
2	40	120
2.5	0	160
3	0	200

Ceteris paribus (other things equal)

- The demand and supply schedules are each constructed on the assumption of ***ceteris paribus*** (Latin for *'[all] other things [being] equal*')
- E.g. if the prices of candies change, the demand for chocolate might also change.
- *Other things equal*, the lower the price of chocolate, the higher the quantity demanded.
- *Other things equal*, the higher the price of chocolate, the higher the quantity supplied.



Equilibrium price

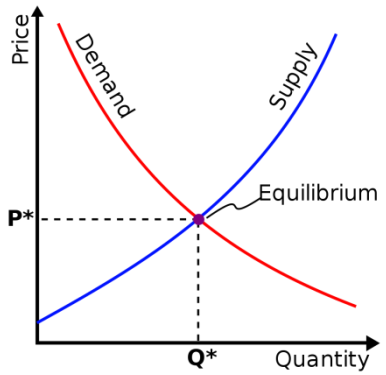
$$P^*: Q_S(P^*) = Q_D(P^*)$$

- We combine the behaviour of buyers and sellers to model the market for chocolate bars.
- At low prices, the quantity demanded exceeds the quantity supplied but the reverse is true at high prices.
- At some intermediate price, which we call the **equilibrium price**, the quantity demanded equals the quantity supplied.

The equilibrium quantity

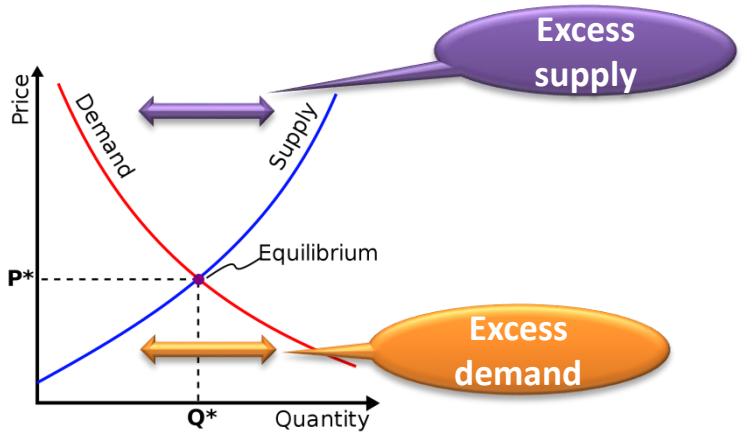
- The **equilibrium price** clears the market for chocolate. It is the price at which the quantity supplied equals the quantity demanded.
- In our previous example, the equilibrium price was €1.5, at which 80 bars is the **equilibrium quantity**, the quantity buyers wish to buy and sellers wish to sell.

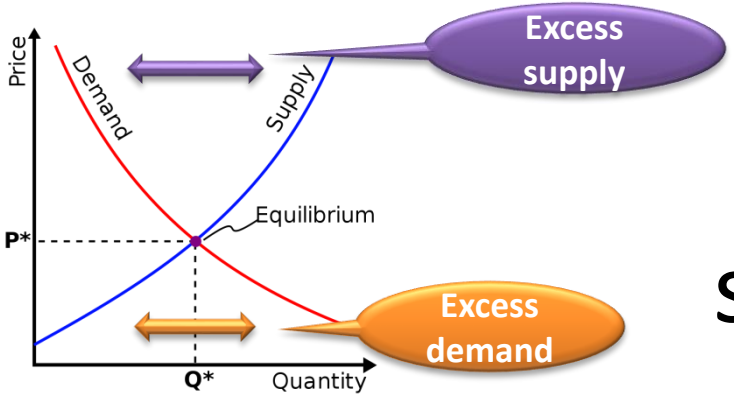
$$Q^* = Q_S(P^*) = Q_D(P^*)$$



Excess demand and supply

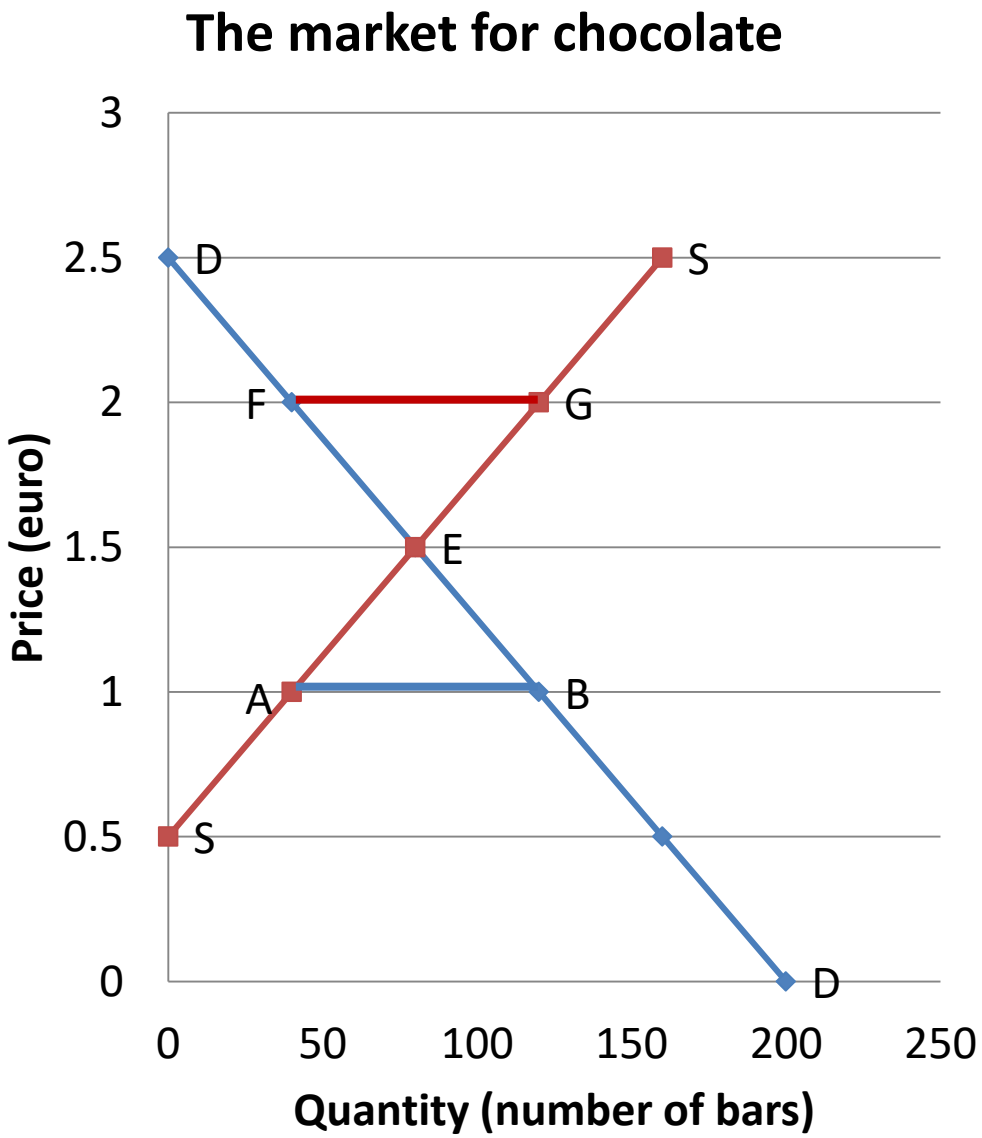
- At prices below the equilibrium price, the quantity demanded exceeds the quantity supplied and some buyers are frustrated. There is a shortage (’excess demand’).
- Conversely, at any price above the equilibrium price, the quantity supplied exceeds the quantity demanded. Sellers have unsold stock (’excess supply’).





Demand and supply curves

- The demand curve shows the relation between price and quantity demanded, holding other things constant. ($D(P)$: $P \rightarrow Q_D$)
- The supply curve shows the relation between price and quantity supplied, holding other things constant. ($S(P)$: $P \rightarrow Q_S$)
- Excess supply or excess demand provide incentives to change prices towards the equilibrium price.



Market equilibrium is at E.

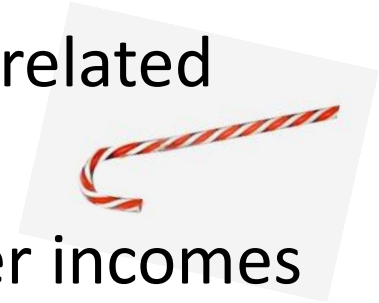
At prices below the equilibrium price there is excess demand: AB shows the excess demand at the price €1.

At prices above the equilibrium price there is excess supply: FG shows the excess supply at the price €2.

Determinants of quantity supplied and demanded

Determinants of quantity demanded:

- Prices of related goods
- Consumer incomes
- Tastes or habits



Shifts in the demand curve

Determinants of quantity supplied:

- The price of inputs
- Technology
- The degree of government regulation

Shifts in the supply curve

The price of the commodity itself

Movements ***along*** a curve

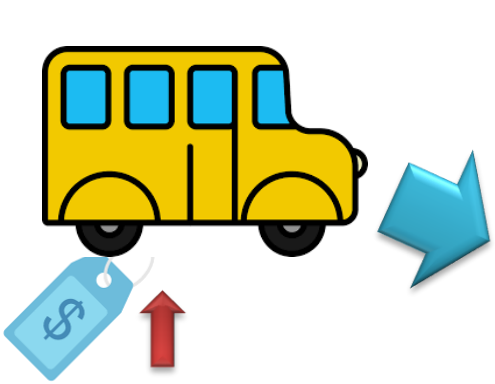
Behind the demand curve

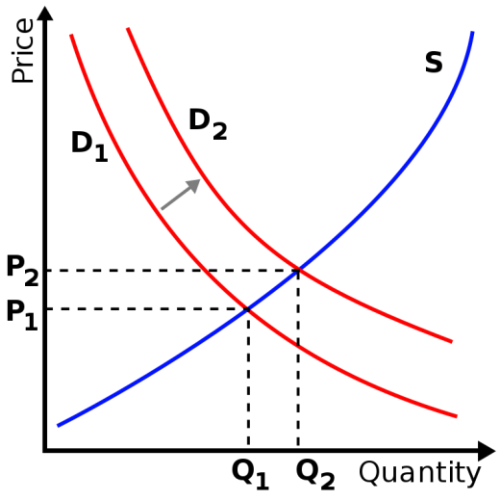
The price of related goods:

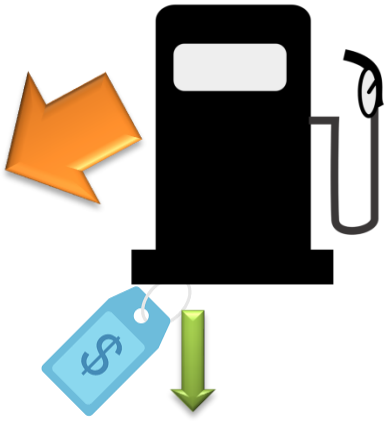
An increase in price of a substitute good (e.g. buses for cars) or a decrease in price of a complement good (petrol for cars) will raise the quantity demanded at each price.

Consumer income:

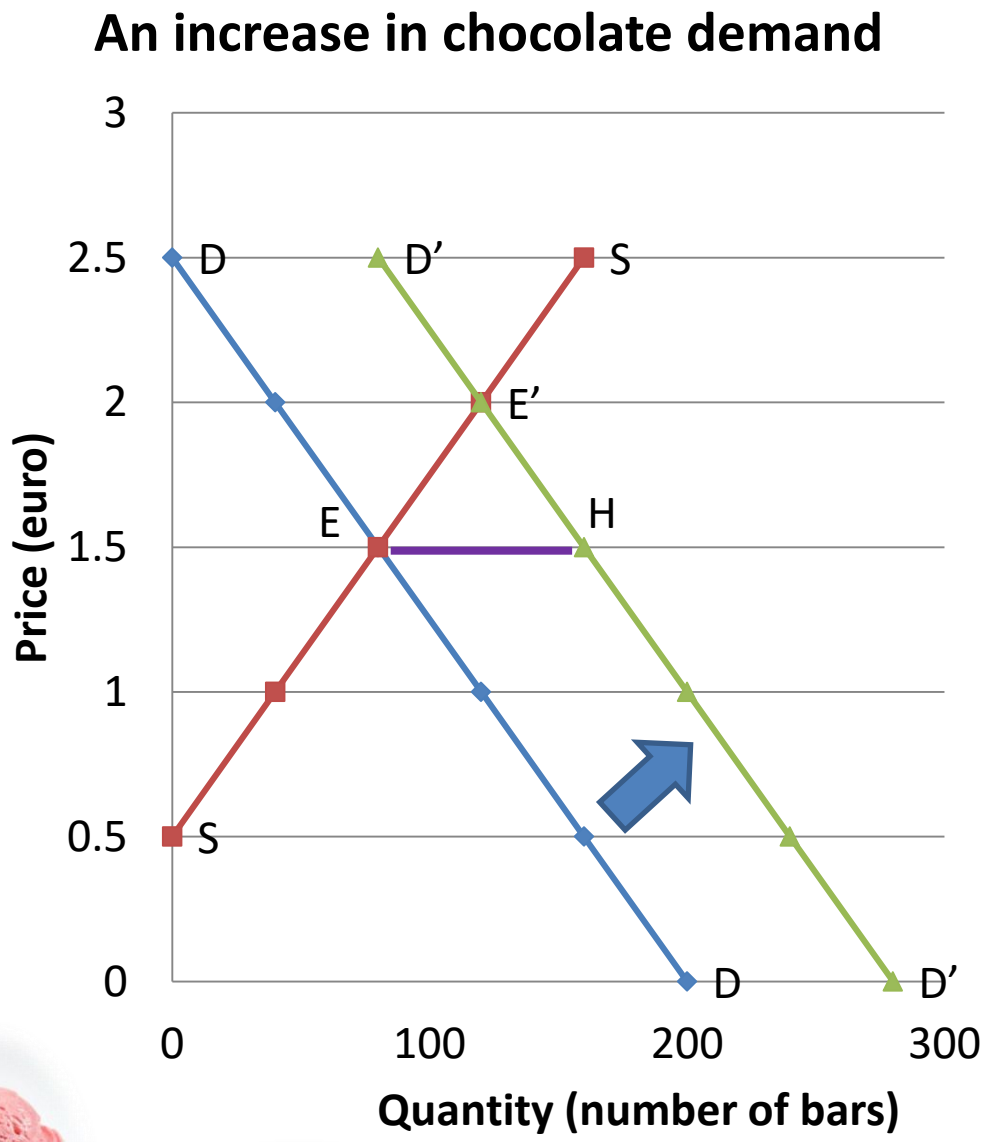
An increase in consumer income will increase demand for the good if the good is a normal good (like most goods) but decrease demand for the good if it is an inferior good (typically, but not necessarily, cheap, low quality goods).



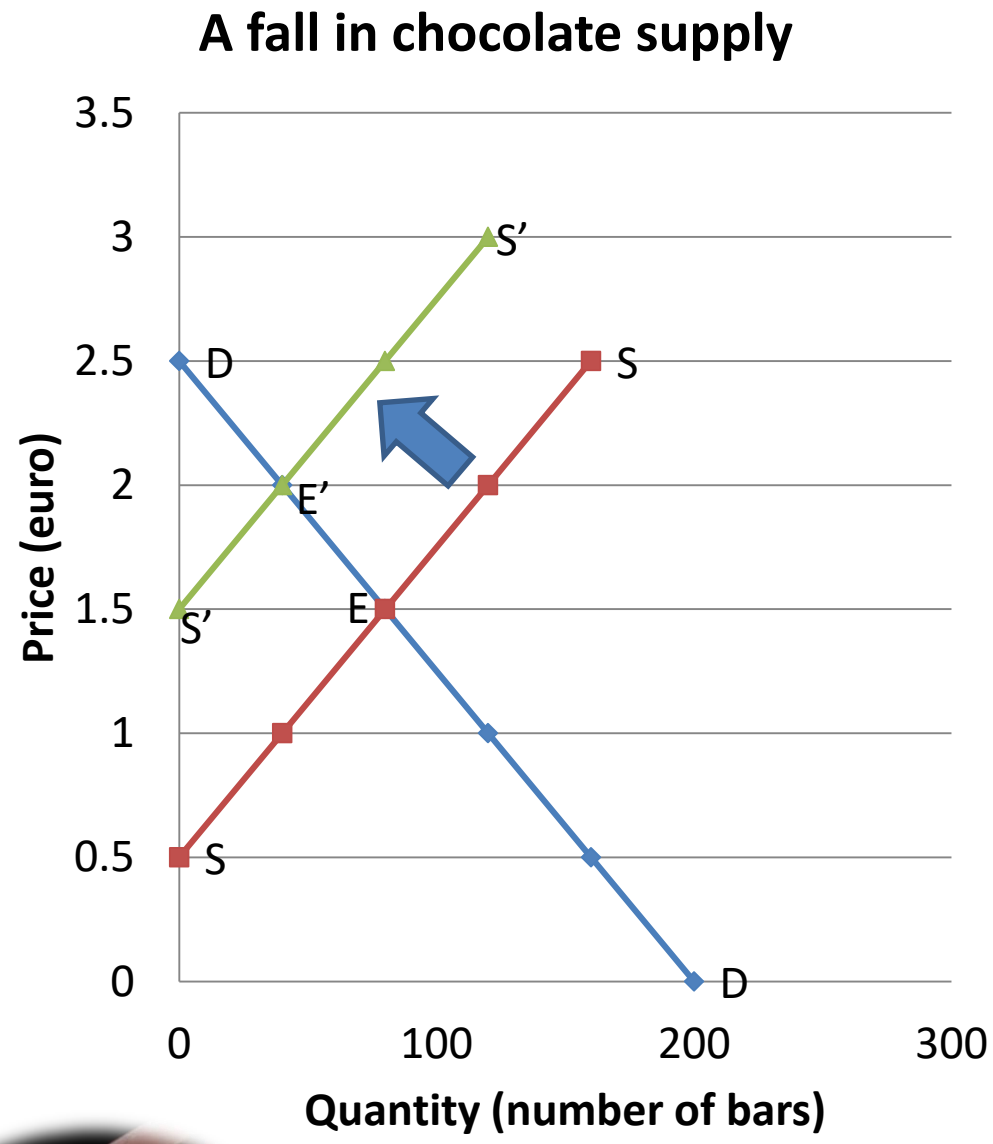




Inferior good: goods/services which are in greater demand during a recession than in a boom, for example second-hand clothes.



At low ice cream prices, the demand curve for chocolate is DD and the market equilibrium occurs at E. Higher ice cream prices raise the demand for chocolate, shifting the demand curve to D'D'. At the former equilibrium price there is now excess demand EH, which gradually bids up the price of chocolate until the new equilibrium is reached at E'.

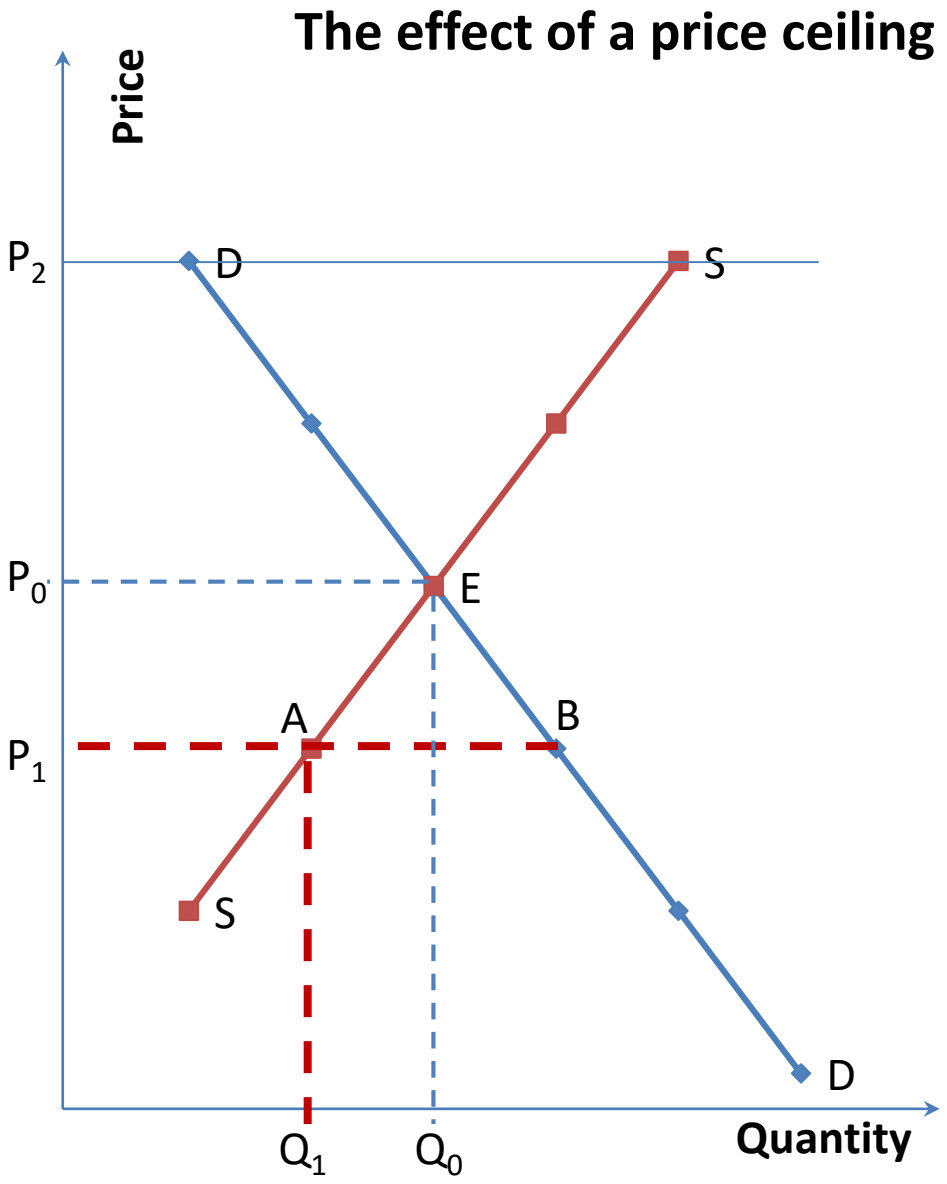


The supply curve initially is SS and market equilibrium is at E. A reduction in the supply of chocolate shifts the supply curve to the left to S'S'. The new equilibrium at E' has a higher equilibrium price and a lower equilibrium quantity than the old equilibrium at E.

- Any factor inducing an increase in demand shifts the demand curve to the right, increasing equilibrium price and equilibrium quantity.
- A decrease in demand (downward shift of the demand curve) reduces both equilibrium price and quantity.
- Any factor increasing supply shifts the supply curve to the right, increasing equilibrium quantity but reducing equilibrium price.
- Reductions in supply (leftward shift of the supply curve) reduce equilibrium quantity but increase equilibrium price.

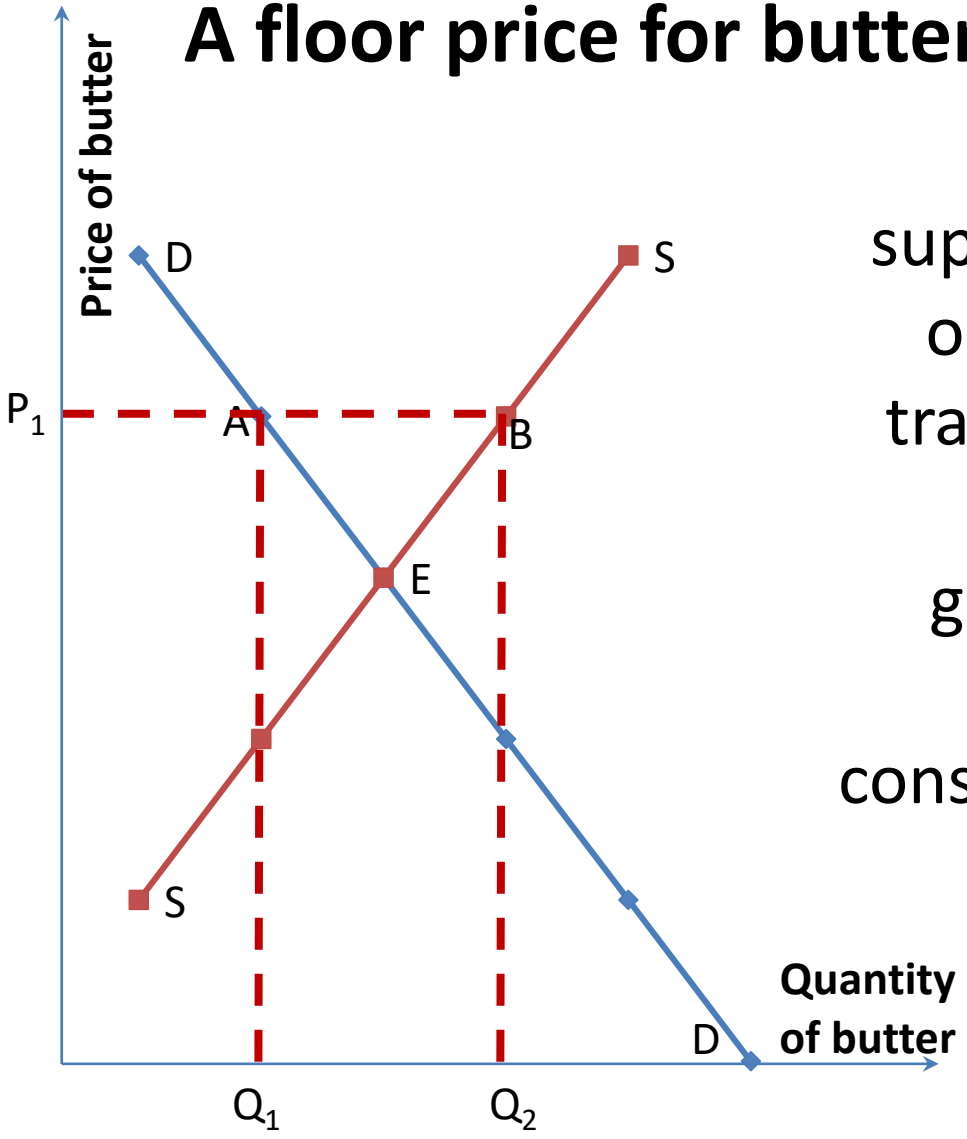
Free markets and price controls

- Free markets allow prices to be determined purely by the forces of supply and demand.
- Price controls are government rules or laws that forbid the adjustment of prices to clear markets.
- **Price ceilings** make it illegal to charge more than a specific maximum price (‘ceiling price’).
- **Price floors** mean that prices can’t be lower than a specific minimum price (‘floor price’).

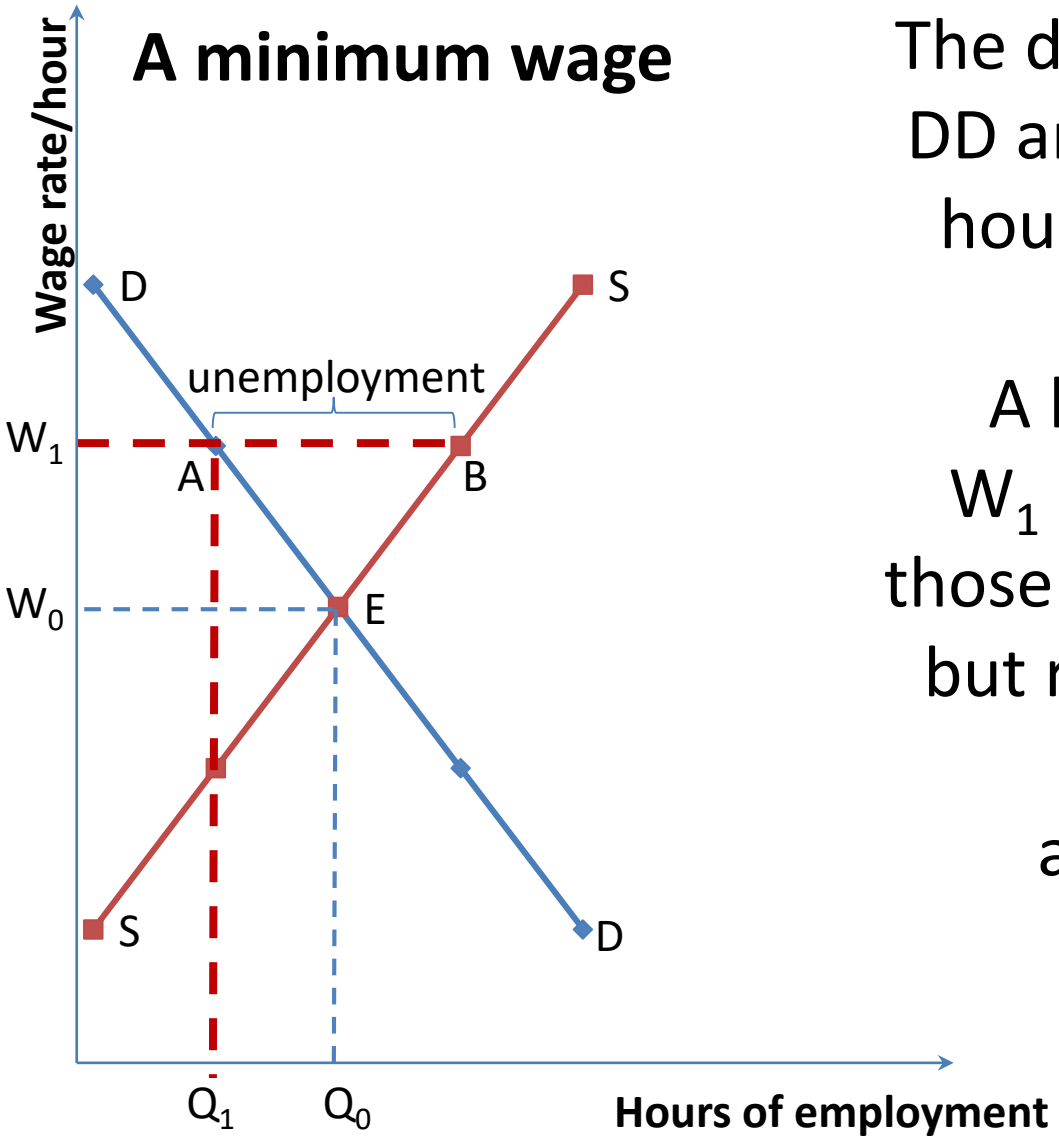


Free market equilibrium occurs at the point E.
The high price P_0 chokes off quantity demanded to ration scarce supply.
A price ceiling at price P_1 succeeds in holding down the price but leads to excess demand AB. It also reduces quantity supplied from Q_0 to Q_1.
A price ceiling at P_2 is irrelevant since the free market equilibrium at E can still be attained.

A floor price for butter



At the floor price P_1 supply is Q_2, but demand only Q_1. Only Q_1 will be traded. By buying up the excess supply AB, the government can satisfy both suppliers and consumers at the price P_1.



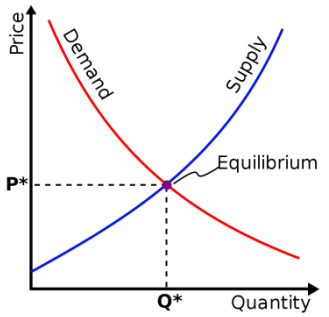
The demand curve for hours DD and the supply curve for hours SS imply free market equilibrium at E.

A legal minimum wage at W_1 raises hourly wages for those who remain employed but reduces the quantity of hours of employment available from Q_0 to Q_1.

Effective price controls

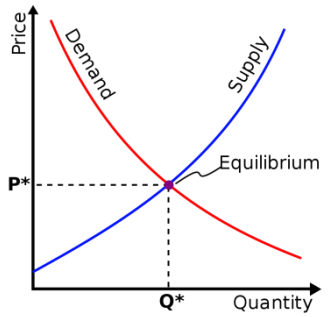
- To be effective, a price ceiling must be imposed below the free market equilibrium price. It will then reduce the quantity supplied and lead to excess demand unless the government itself provides the extra quantity required.
- An effective price floor must be imposed above the free market equilibrium price. It will then reduce the quantity demanded unless the government adds its own demand to that of the private sector.

How markets answer what and for whom to produce?

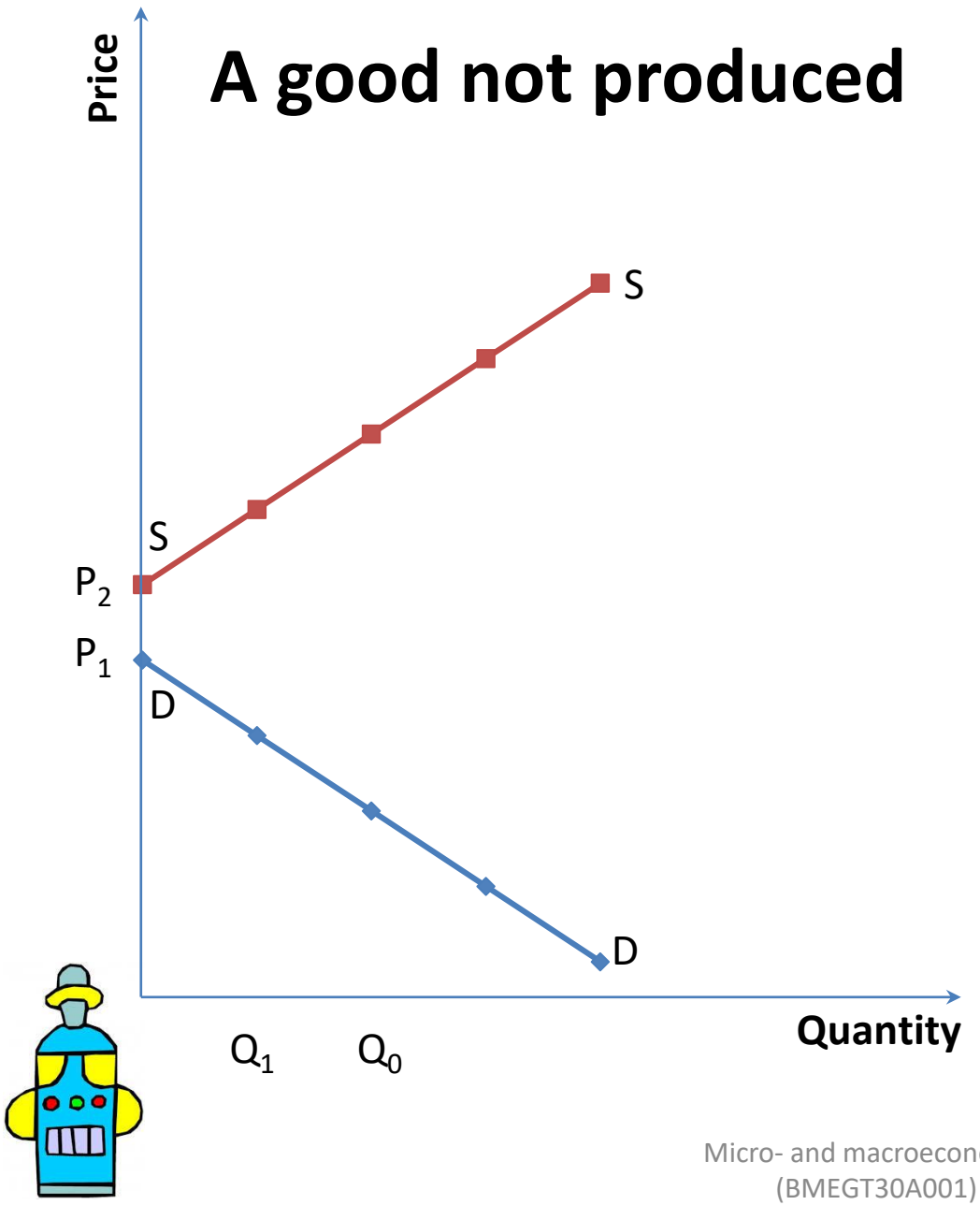


- The market decides how much of a good should be produced by finding the price at which the quantity demanded equals the quantity supplied.
- The market tells us for whom the goods are produced: each good is purchased by all those consumers willing (and able to) pay at least the equilibrium price for the good.

How markets answer what and for whom to produce?



- The market also tells us who is producing: all those willing to supply at the equilibrium price.
- Finally, the market determines what goods are being produced. Nature supplies goods free of charge, but people engage in costly (*including op. costs*) production activities only if they are paid. The supply curve tells us how much has to be paid to induce supply.



The figure to the left shows a good that will not be produced. Even P_1, the highest price consumers will pay, is lower than P_2, the minimum price producers require to produce any of this good.