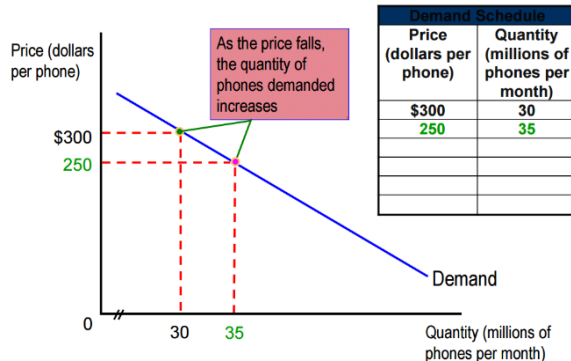


Week 3 – Demand, Market Equilibrium and Elasticity

Demand



Total Benefits: Sum of the Marginal Benefits

Marginal benefit: The additional benefit to a consumer from consuming one more unit of a good or service.

Diminishing MB: as more of a good is consumed, MB of additional units likely to decrease

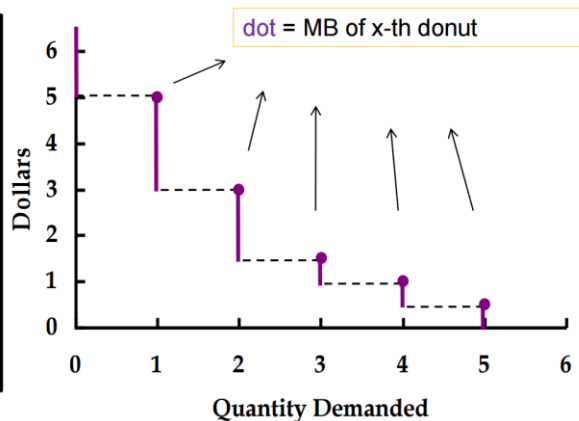
Willingness to pay: maximum amount an individual is willing to pay for a good.

Law of Demand: when price increases, QD then decreases and when P increases QD decreases. (Negative relationship)

What explains law of demand?

- **Substitution effect:** change in price makes a substitute good/service relatively more or less expensive.
- **Income effect:** a change in the impact of price on a consumer's Purchasing Power leads to a change in QD.

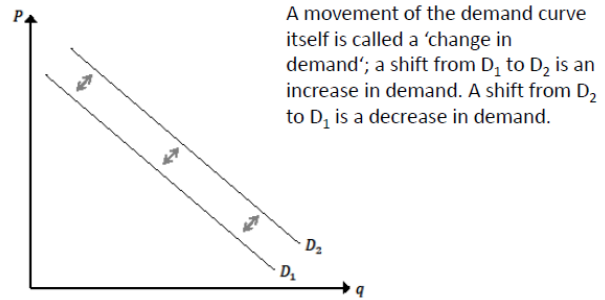
Q of donuts	WTP	Marg Benefit
0	\$0.00	
1	\$5.00	\$5.00
2	\$8.00	\$3.00
3	\$9.50	\$1.50
4	\$10.50	\$1.00
5	\$11.00	\$0.50



- A movement along the demand curve is known as a '**change in the quantity demanded**'
- Generally, demand curves are represented as continuous for an individual and for the market.
- **Key idea:** a rational consumer will buy such an amount that for the last unit consumed, price equals marginal benefit. **P=MB.**
- A shift of the demand curve is called a '**change in demand**'.

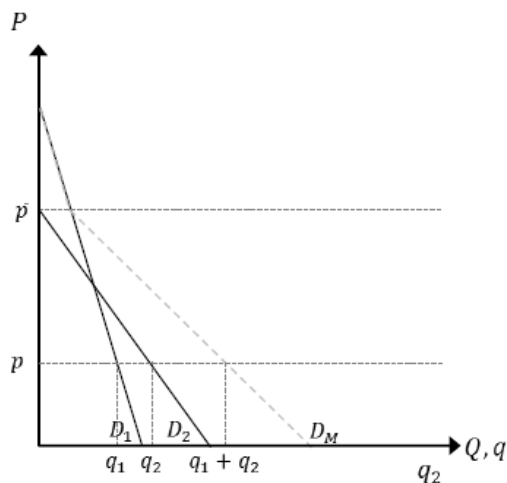
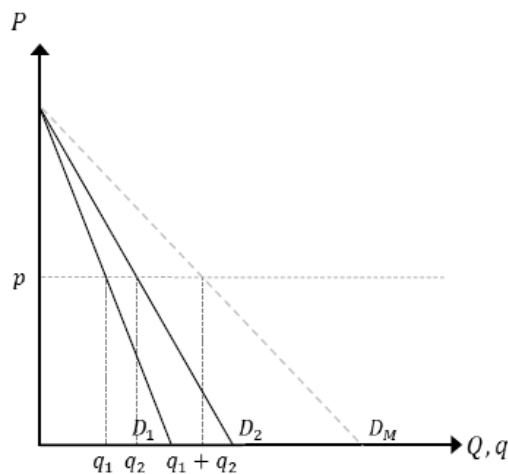
Variables that shift market demand:

1. Income
2. Price of related goods
3. Population and demographics
(change in size of market)
4. Changes in tastes + preferences
5. Expected future prices



Market demand curve = horizontal sum of individual demand curves.

- To find this curve also solve each individual curve of TQD and find Y-intercept and slope.



Q: Which of the following implies an increase in the demand for mangoes? (Outward shift)

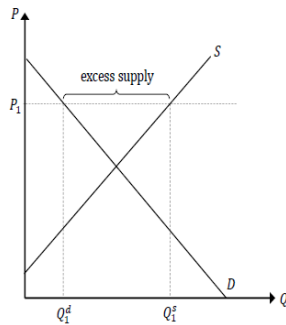
- A. Fall in income levels for many households (with mangoes being a normal good) – decrease in demand (inward shift)
- B. Perfect mango-growing weather – increase in supply
- C. New advertisement emphasizing the health benefits of eating mango – increase in demand (outward shift)
- D. Falling market price of mangoes – increase in the quantity demanded

Market equilibrium and welfare analysis

Market Equilibrium

- ◆ At the market price, the quantity demanded by consumers equals the quantity supplied by firms in the market
- ◆ Price at market equilibrium – 'Market Clearing Price'

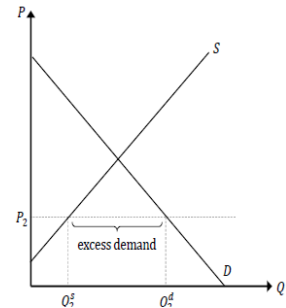
Excess Supply



If the market price is above the equilibrium price, the quantity supplied exceeds the quantity demanded.

The downward pressure on prices will continue until the excess of supply is eliminated, moving the market towards equilibrium.

Excess Demand



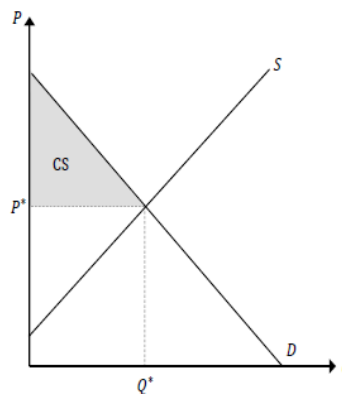
If the market price is below the equilibrium price, there is excess demand.

The upward pressure on prices will continue until the excess of demand is eliminated, moving the market towards equilibrium.

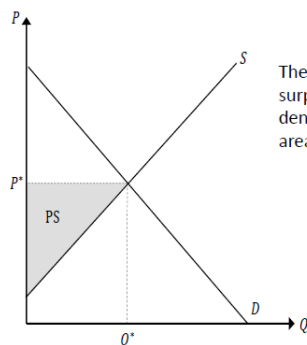
Welfare Analysis - Efficiency

Consumer surplus: The difference between the highest prices a consumer is willing to pay and the price a consumer actually pays.

- Measures net benefit (total benefit - total price paid) to consumers
- An individual's CS is by calculating the area between the individual demand curve and the price line.
- Similarly, CS of all consumers in the market is the area between the market demand curve and the price line.



The area of consumer surplus in this market is denoted by the grey-shaded area – the area under the demand curve above the price line.



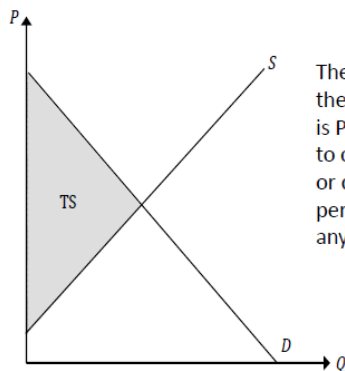
The area of producer surplus in this market is denoted by the grey-shaded area.

Producer surplus: The difference between the lowest prices a firm would have been willing to accept and the price the firm actually accepts.

- This measures net benefit (total benefit - total cost of production) to producers

Total surplus: the sum of consumer surplus and producer surplus.

Deadweight loss: the reduction in economic surplus resulting from a market not being in competitive equilibrium.



The competitive market maximizes the total gains from trade, hence it is Pareto efficient. It is not possible to change the level of output (up or down) and make at least one person better off without making anyone worse off.

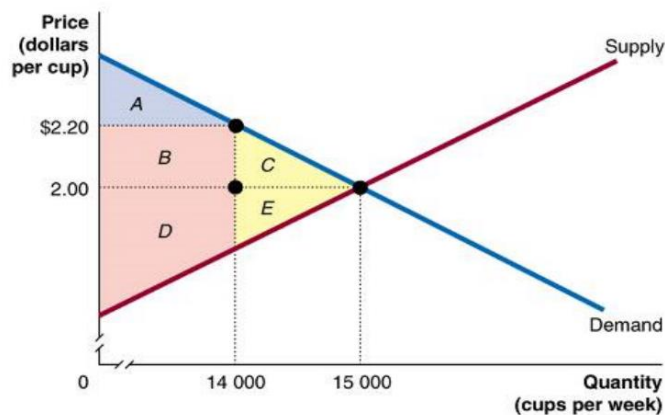
Pareto efficiency – if it is not possible to reallocate resources and make someone better off without making someone else worse off, it maximizes total surplus.

- Trading all units up until Q^* increases total surplus (as it

increases CS, PS or both).

- In the competitive-market equilibrium, all the potential gains from trade are exhausted.

	At competitive equilibrium	At a price of \$2.20
Consumer surplus	$A + B + C$	A
Producer surplus	$D + E$	$B + D$
Deadweight loss	None	$C + E$



Elasticity

Elasticity: measures how responsive one variable (y) is to changes in another variable (x).

E.g. the effect of price on demand

$$\epsilon = \frac{\% \Delta y}{\% \Delta x} \quad \epsilon = \frac{\Delta y / y}{\Delta x / x}$$

This says for 1% change in x there will be a $\epsilon\%$ change in y .

The Point Method

- What is the elasticity on a demand curve around the point (Q_1, P_1)?

$$\varepsilon = \frac{\Delta y / y}{\Delta x / x} = \frac{\Delta y}{\Delta x} \cdot \frac{x}{y} = \frac{dy}{dx} \cdot \frac{x}{y}$$

Example: $Q=100-2P$, $P=30$

From the demand equation, we know that when $P = 30$, $Q = 40$. The slope of this line is -2.

$$\varepsilon = -2 \cdot \frac{30}{40} = -1.5$$

The interpretation is: at this price, if price of forks increases by 1%, the quantity demanded of forks falls by 1.5%.

Note: elasticity is a unit-free measure.

The Midpoint (or arc) Method

- This formula is used to ensure that the value of the price elasticity of demand between the same two points is the same whether the price increases or decreases.

$$\varepsilon = \frac{\Delta y / y^m}{\Delta x / x^m} = \frac{\Delta y}{\Delta x} \cdot \frac{x^m}{y^m}$$

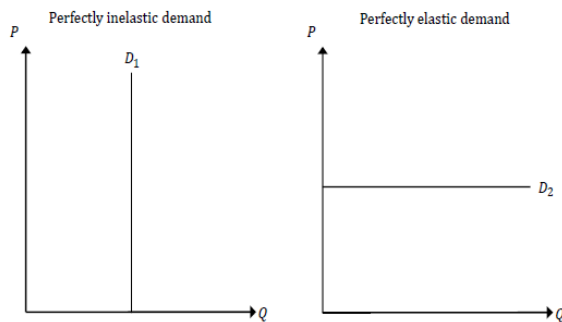
$$y^m = \frac{y_1 + y_2}{2} \text{ and } x^m = \frac{x_1 + x_2}{2}$$

Price elasticity of demand: responsiveness of the quantity demand of a good to a change in its price.

Interpretation of the elasticity of demand:

- Given the law of demand, the elasticity of demand will normally be negative (or at least non-positive).
- $\epsilon_d = 0$, demand is **perfectly inelastic**.
 - For a 1% change in price, there is no change in the quantity demanded.
 - Quantity demanded is not at all responsive to changes in price. The demand curve is vertical
- $-1 < \epsilon_d < 0$, demand is **inelastic**.
 - For a 1% change in price, the resulting change in quantity demanded is less than 1%.
 - Quantity demanded is not very responsive to changes in price.
- $\epsilon_d = -1$, demand is **unit elastic**.
 - For a 1% change in price, there is a 1% change in quantity demanded (a proportional change)
- $\epsilon_d < -1$, demand is **elastic**.

- A 1% change in price results in a change in quantity demanded larger than 1%; quantity demanded is very responsive to price.
- $\epsilon_d = -\infty$, demand is **perfectly elastic**.
 - For a small increase in price, quantity demanded will drop to zero.
 - If a firm raises its price at all, its customers will go elsewhere to buy the product. Demand is horizontal.
- **Revenue is maximised when elasticity is equal to 1**



When demand is perfectly inelastic, the demand curve is vertical (as seen the left panel). When demand is perfectly elastic, the demand curve is horizontal (as seen the right panel).

good in the consumer's budget.

Determinants of price elasticity of demand:

1. Availability of close substitutes
2. Length of time involved
3. Necessities versus luxuries
4. Definition of the market
5. Share of expenditure of the

6. Price elasticity and total revenue:

- **Total revenue**: the total amount of funds recieved by a supplier for selling a good or service.

$$TR = P \times Q$$

When demand is **unit elastic**, price does not affect total revenue.

