2.0 MARKET ANALYSIS

The traditional definition of the word ‘market’ is that, it is a place or area where goods and services are bought and sold. However, in modern economies, a market is a system by which sellers and buyers of a commodity interact to settle its price and the quantity to be bought and sold.

Demand and Supply

Demand refers to how much (quantity) of a product or service is desired by buyers. Quantity demanded is the amount of a product one is willing and able to buy at a certain price. The relationship between price and quantity demanded is known as the demand relationship.

Supply represents the quantity suppliers are willing to offer for sale. The quantity supplied refers to the amount of a certain good producers are willing and able to supply at a particular price. The correlation between price and how much of a good or service is supplied to the market is known as the supply relationship.

The Law of Demand

The law of demand states that, if all other factors remain equal, the higher the price of a good, the less people will demand that good. In other words, the higher the price, the lower the quantity demanded. The amount of a good that buyers purchase at a higher price is less because as the price of a good goes up, so does the opportunity cost of buying that good. As a result, people will naturally avoid buying a product that will force them to forgo the consumption of something else they value more.

The demand function

This explains the relationship between quantity demanded of a commodity and factors that affect it.

Let us consider a very simple case of a demand function. Suppose all the determinants of the demand for commodity ***X*** other than its price remain constant. The quantity demanded of X (***Qdx***) depends upon its price (***Px***). This can be represented as

Qdx = ƒ (px). In this function Qdx is ***a dependent*** variable while Px is the ***independent*** variable. This implies that a change in ***Px*** (independent variable) causes a change in ***Qdx*** (dependent variable).

The general form of a linear demand function is denoted as:

$$Qdx = a - bPx$$

Where;

Qdx is quantity demanded of commodity X

a is a constant denoting total demand at 0 price.

Px is price of commodity X

b is change in demand arising from a given change is the price of a commodity i.e. $\frac{\Delta Q}{\Delta P} = -b$.

$-b$ implies that there exists an inverse relationship between a change in price and the resultant change in the quantity demanded of the commodity.

The general demand function is given as;

$$Qd = P, Py, Y, T, S, Pt + 1, RC, Sx, E, M, A, Nc, L$$

P = price of the commodity

Py = Price of other related commodities

Y = income of consumers

T = tastes and preferences

S = season of the year

Pt+1 = future price expectation of the commodity

Rc = religion and cultural factors

Sx= sex

E = education levels

M = marital status

A = age

Nc = number of consumers

L= location

A DEMAND SCHEDULE

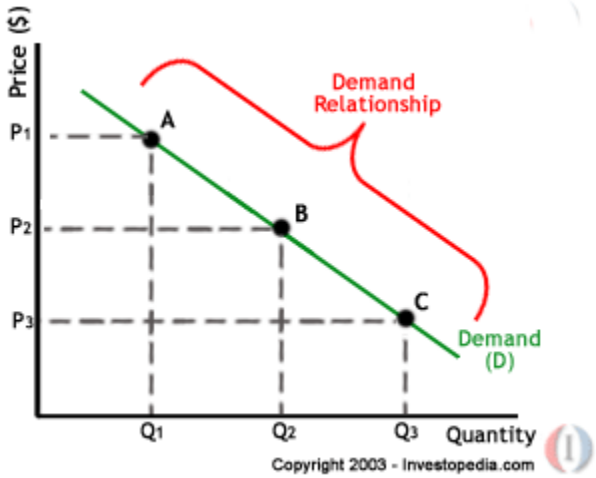
A demand schedule is ***a tabular representation*** of the demand curve. It is a table showing, how much quantity of the commodity will be demanded at each respective price. From the demand schedule we form the demand curve. The demand curve is ***a graphical*** representation of the demand schedule and can be represented as below.

A demand schedule

Price	Quantity Demanded
100	0
90	1
80	3
70	5
60	8
50	13
40	20
30	30

Demand curve

The demand curve is a graphical representation of the demand schedule. It gives the relationship between quantity demanded and the price of a given commodity.

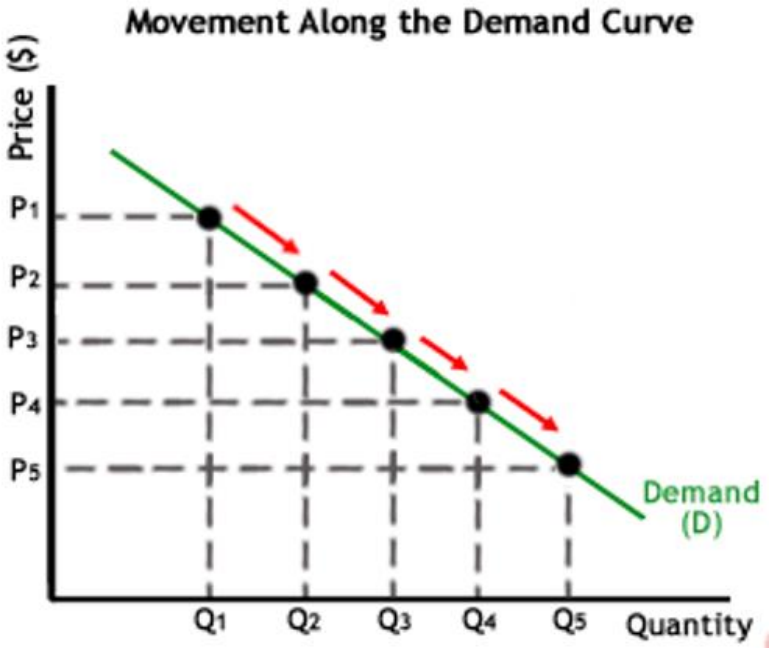


A, B and C are points on the demand curve. Each point on the curve reflects a direct correlation between quantity demanded (Q) and price (P). So, at point A, the quantity demanded will be Q1 and the price will be P1, and so on. The demand relationship curve illustrates the negative relationship between price and quantity demanded. The higher the price of a good the lower the quantity demanded (A), and the lower the price, the more the good will be in demand (C).

Change in demand and change in quantity demanded

Change in quantity demanded is exclusively caused by changes in the price of the commodity other factors being constant. It is also indicated by ***a movement*** long the demand curve upward or downwards. As prices change, respective quantities demanded also change. It is shown by the movement along the demand curve.

Diagram



Change in demand is caused by a change in any other factor of demand other than price. It indicates ***shifts in the demand*** curve to either the right or the left of the original curve.

Diagram

Exceptions to the Law of demand

The law of demand is one of the fundamental laws of economics. The law of demand, however, does not apply to the following cases:

(i) Expectations regarding future prices. When consumers expect a continuous increase in the price of a commodity, they buy more of it the despite increase in its price, to avoid the pinch of even higher future prices. Similarly, when consumers anticipate a considerable decrease in future prices, they postpone their purchases and wait for the price to fall further, rather than buy the commodity when its price initially falls. Such decisions of the consumers are contrary to the law of demand.

(ii) Prestigious good/ articles of ostentation/ Veblen (snob effect). The law does not apply to commodities which serve as a 'status symbol', to enhance social prestige or display wealth and richness, e.g., gold, precious stones, rare paintings and antiques, etc. Rich people buy such goods mainly because their prices are high.

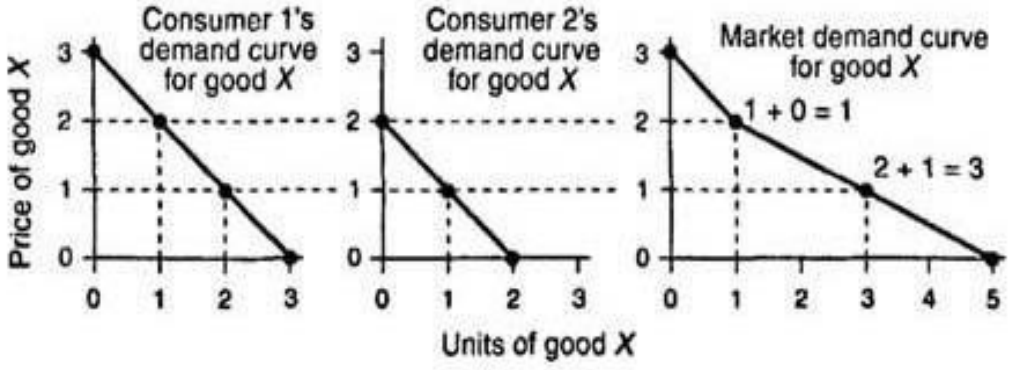
(iii) Giffen goods. An exception of this law is also the classic case of Giffen goods named after a British economist Sir Robert Giffen. A Giffen good does not mean any specific commodity. It may be any essential commodity much cheaper than its substitutes, consumed mostly by the poor households and claiming a large part of their income. If price of such goods increases (price of its substitute remaining constant), its demand increases instead of decreasing.

The concept of market demand

Market demand is the sum of all individual demand for a given commodity at a price per unit of time. This can be reflected in the market demand scheduled as below.

Price	Consumer A	Consumer B	Consumer C
100	1	2	3
90	3	4	7
80	5	7	12
70	8	10	18
60	12	15	27
50	16	24	40

Diagram of market demand

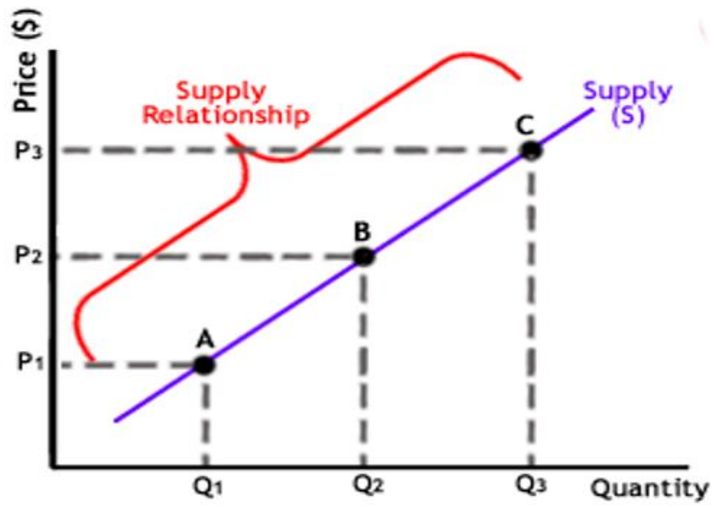


SUPPLY

Supply refers to the amount of a commodity which a producer is willing to bring to the market at the prevailing price. The factors that influence supply differ from one commodity to another.

B. The Law of Supply

The law of supply states that all else held constant, the higher the price the higher the quantity supplied and the lower the price the lower the quantity supplied.



A, B and C are points on the supply curve. Each point on the curve reflects a direct correlation between quantity supplied (Q) and price (P). At point B, the quantity supplied will be Q2 and the price will be P2, and so on.

SUPPLY FUNCTION

This shows the mathematical relationship between the quantity supplied of a given commodity (dependent variable) and its determinants (independent variable).

The general form of a linear supply function is denoted as; $Qs_X = -C + dP_X$

Where;

Qs_X is Quantity supplied of commodity X

-*c* is a constant denoting total supply at ‘ 0’ price.

d is change in supply arising from a given change is the price of a commodity i.e.

$$\frac{\Delta Qs_x}{\Delta Px} = d$$

+*d* implies that there exists positive relationship between a change in price and the resultant change in the quantity supplied of the commodity. Note that d. is a constant.

The determinants of supply include:

- The price of the commodity

- The level of the technology
- Cost of production
- Government policy
- Gestation period
- Availability of inputs
- Seasonal factors

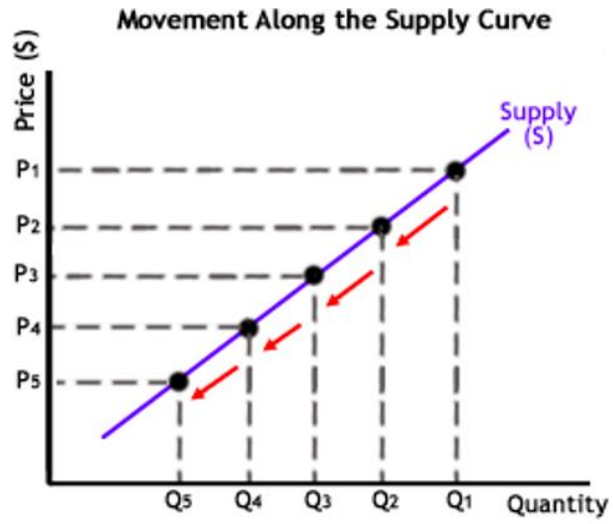
Change in Supply Vs Change in Quantity Supplied

Change in supply is the increase or decrease in the amount of commodity supplied due to changes in other factors that affect the supply of that commodity at a constant price. It is shown by ***shifts*** in the supply curve to either the right or the left of the original curve

Diagram

Change in quantity Supplied is caused by changes in the price of the commodity other factors remaining constant. It is shown by ***a movement*** long the supply curve upward or downwards. As prices change, respective quantities supplied also change.

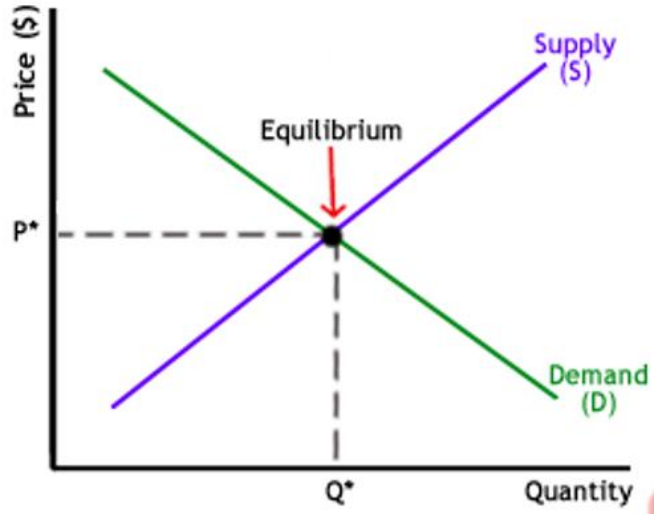
Diagram



Equilibrium

When supply and demand are equal (i.e. when the supply function and demand function intersect) the market is said to be in equilibrium. At this point, the allocation of goods is at its most efficient because the amount of goods being supplied is exactly the same as the amount of goods being demanded. Thus, everyone (individuals, firms, or countries) is satisfied with the current economic condition. At the given price, suppliers are selling all the goods that they have produced and consumers are getting all the goods that they are demanding.

Diagram



NOTE: In the real market place equilibrium can only ever be reached in theory, so the prices of goods and services are constantly changing in relation to fluctuations in demand and supply.

Mathematical derivation of market equilibrium

Qd =a-bp

Qs = -c +dp

Qs=Qd

-c+dp = a-bp

dp+bp = a+c

p(d+b) = a+c

d+b d+b

P = a+c

d+b

Qd = 500-3p

Qs = -100 +5p

Find Pe and Qe

Numerical examples

Example 1

$$Qd = P = 200 - Q/10$$

$$Qs = P = 20 + Q/20$$

Find the equilibrium Price and Quantity

Example 2

$$Qd = 500 - 3p$$

$$Qs = -100 + 5p$$

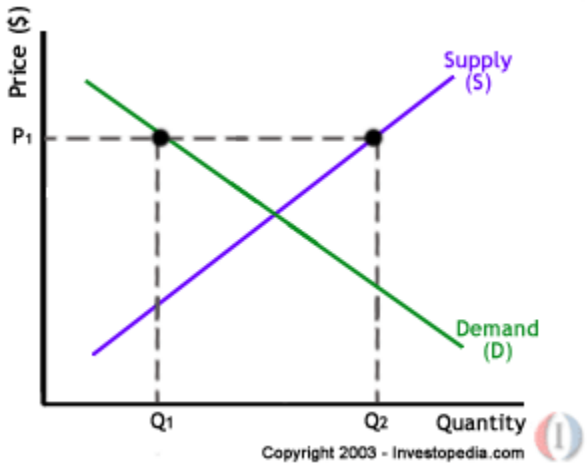
Find the equilibrium Price and Quantity

DISEQUILIBRIUM

Disequilibrium occurs whenever the price or quantity is not equal to P* or Q*.

1. **Excess Supply**

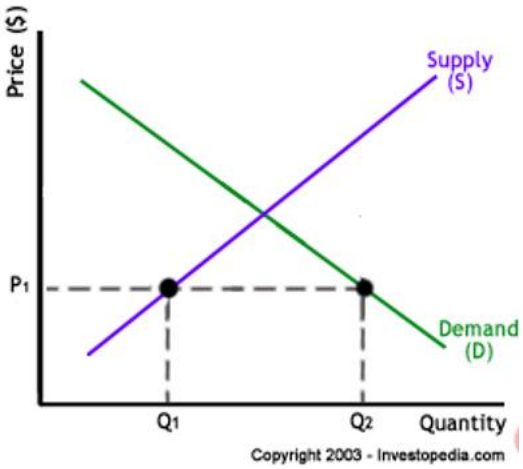
If the price is set too high, excess supply will be created within the economy and there will be allocative inefficiency.



At price P1 the quantity of goods that the producers wish to supply is indicated by Q2. At P1, however, the quantity that the consumers want to consume is at Q1, a quantity much less than Q2. Because Q2 is greater than Q1, too much is being produced and too little is being consumed. The suppliers are trying to produce more goods, which they hope to sell to increase profits, but those consuming the goods will find the product less attractive and purchase less because the price is too high.

2. Excess Demand

Excess demand is created when price is set below the equilibrium price. Because the price is so low, too many consumers want the good while producers are not making enough of it.



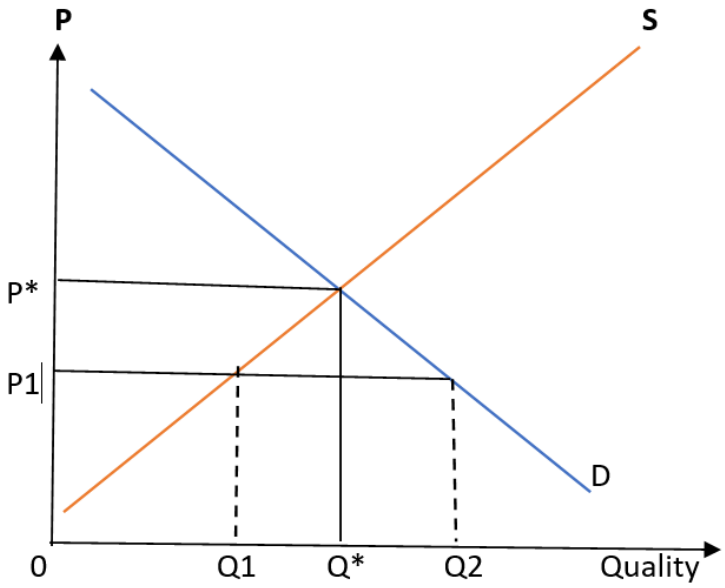
In this situation, at price P1, the quantity of goods demanded by consumers at this price is Q2. Conversely, the quantity of goods that producers are willing to produce at this price is Q1. Thus, there are too few goods being produced to satisfy the wants (demand) of the consumers. However, as consumers have to compete with one other to buy the good at this price, the demand will push the price up, making suppliers want to supply more and bringing the price closer to its equilibrium.

THE CONCEPT OF MAXIMUM AND MINIMUM PRICE POLICY (Deviation from the equilibrium)

Government can intervene in a market and this creates disequilibrium in that market. Government can intervene by setting either a maximum (price ceiling) or minimum price (price floor).

Price Ceiling

Also known as maximum price legislation is the price that is set by the government below equilibrium above which it is illegal to sell. The fixed price acts as the maximum price possible.



Reasons for setting a price ceiling

This is intended to enable consumers to purchase especially essential commodities at a lower price than the one determined by the market forces of demand and supply. This is because during crises, producers take the advantage of scarcity and charge higher prices.

Effects of a price ceiling (to be explained in class)

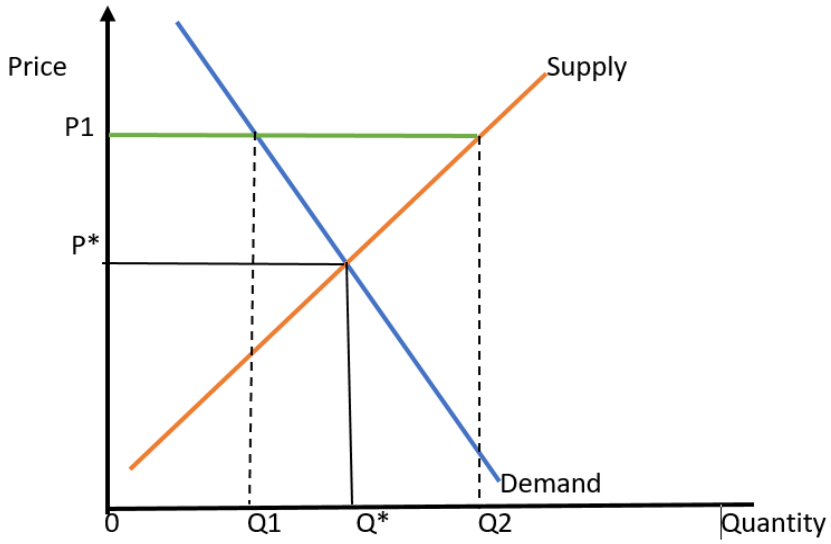
- Demand exceeds supply
- Long queue's develop
- Rationing of the commodity
- There is hoarding
- Customer discrimination
- Price discrimination

Price floor (Minimum price)

This is a price that is set by government above the equilibrium price below which it is illegal to sell. The fixed price therefore becomes the minimum price at which at which all

firms should sell. The reason for setting a minimum price is to enable producers to recover the costs of production and keep them in business. It is mainly done during a period of high production when supply exceeds demand and consumers are offering low prices.

Diagram



The underlying effect of minimum price legislation is that it encourages production which could result into over utilization of resources.

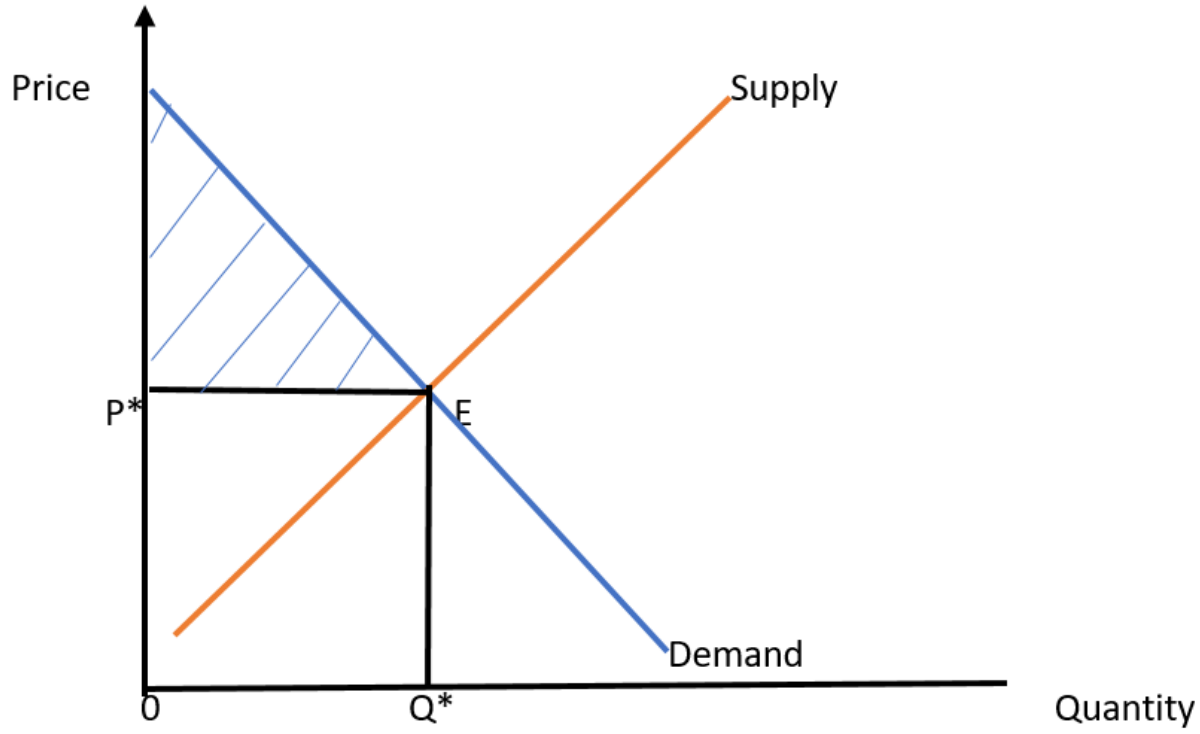
Effects of a price Floor (to be explained in class)

- Supply exceeds Demand
- Over utilisation of resources.

CONSUMER AND PRODUCER SURPLUS

Consumer surplus thus is the difference between what a consumer is willing to pay and what he actually pays for the same quantity of a commodity. If the price a consumer is

willing to pay is higher than the price which he actually pays, then the consumer is said to have a surplus.



Consumer surplus may be obtained from the demand schedule as shown below

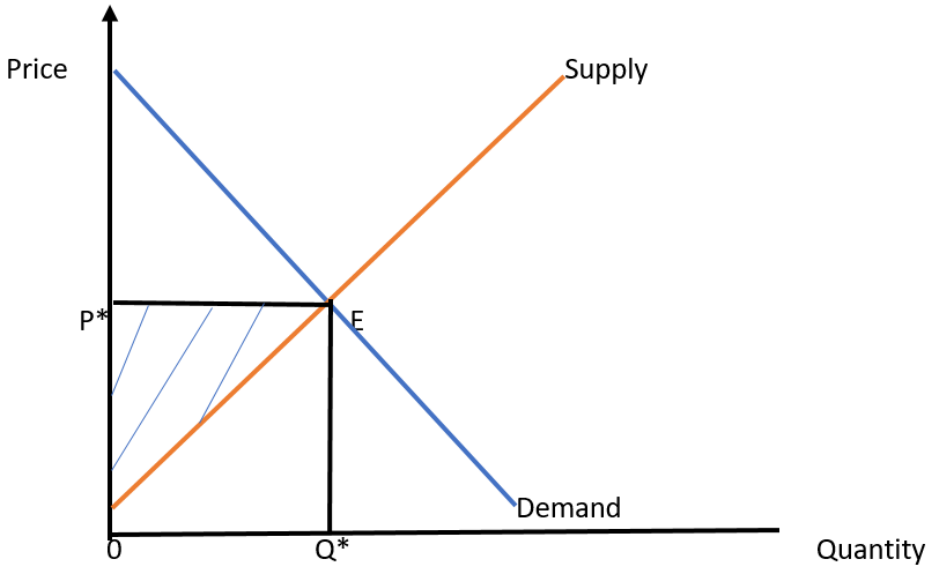
Px	**Qx**
70	1
60	3
50	6
40	10
30	15
20	25
10	50

Given that the market price is 40, calculate the consumer surplus.

Producer Surplus

Producer surplus refers to the different between the amount of money the producer actually receives upon the sale of given quantity of output and the minimum amount she/ he would be willing to accept for the same quantity.

Diagram



Computing producer surplus from a supply schedule

Px	**Qx**
5	2
10	5
15	9
20	16
25	23
30	35
35	67

Determining the Consumer and Producer Surplus from a demand and supply functions
Given the equation $Qd = 250 - 5Px \; and \; Qs = -70 + 3Px$, calculate the consumer and producer surplus

THE CONCEPT OF ELASTICITY

Elasticity

This refers to the degree of responsiveness of one variable to changes in another variable.

There are two major types of elasticity and these include: ***elasticity of demand and elasticity of supply***.

Elasticity of demand

Refers to the percentage change in quantity demanded of a commodity arising from a given percentage change in its determinants. Or it is the degree of responsiveness of quantity demanded of a commodity to changes in its determinants.

We will focus on the three type of elasticity of demand:

- Price elasticity of demand
- Cross elasticity of demand
- Income elasticity of demand

Price elasticity of demand

This refers to the degree of responsiveness of the quantity demanded of a commodity to a given change in its own price.

The price elasticity of demand measures the sensitivity of the quantity demanded to price. The price elasticity of demand is the percentage change in quantity demanded (Q) brought about by a 1 percent change in price (P), which means that

$$\varepsilon_P = \frac{Percentage\ change\ in\ Quantity}{Percentage\ \ change\ in\ Price}$$

If ΔQ is the change in quantity and ΔP is the change in price, then

$$\text{Percentage change in Quantity} = \frac{\Delta Q}{Q} \text{ X } 100\%$$

and

$$\text{Percentage change in price} = \frac{\Delta P}{P} \text{ X } 100\%$$

Thus, the price elasticity of demand is

$$\varepsilon_P = \frac{\frac{\Delta Q}{Q} \text{ X } 100\%}{\frac{\Delta P}{P} \text{ X } 100\%}$$

Or

$$\varepsilon_P = \frac{-\Delta Q}{\Delta P} \text{ X} \frac{P}{Q}$$

For example, suppose that when the price of a good is \$10 (P = 10), the quantity demanded is 50 units (Q =50), and that when the price increases to \$12 (ΔP = 12), then quantity demanded decreases to 45 units (ΔQ =-5). If we plug these numbers into the formula, we find that in this case the price elasticity of demand is

$$\varepsilon_P = \frac{-\Delta Q}{\Delta P} \text{ X} \frac{P}{Q} = (-)\frac{-5}{2} \text{ x} \frac{10}{50} = 0.5$$

As illustrated by this example, the value of ε_P must always be negative, reflecting the fact that demand curves slope downward because of the inverse relationship of price and quantity: When

price increases, quantity decreases, and vice versa. The following table shows how economists classify the possible range of values for $\mathcal{E}_P$

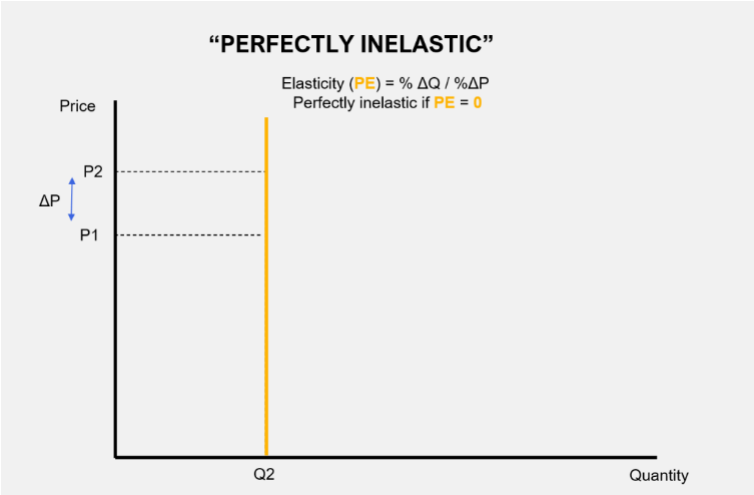
Price elasticity of demand ranges from perfectly inelastic to perfectly elastic.

Perfectly inelastic demand Price elasticity of demand equal to 0.	Value of $\mathcal{E}_P$	Classification	Meaning
	0	Perfectly inelastic demand	Quantity demanded is completely insensitive to price.
Price elasticity of demand between 0 and -1.	between 0 and -1	inelastic demand	Quantity demanded is relatively insensitive to price.
unitary elastic demand Price elasticity of demand equal to -1.	-1	Unitary elastic demand	Percentage increase in quantity demanded is equal to Percentage decrease in price.
elastic demand Price elasticity of demand between -1 and -∞	Between -1 and -∞	Unitary elastic demand	Quantity demanded is relatively sensitive to price.
demand Price elasticity of demand equal to -∞	-∞	Perfectly elastic demand	Any increase in price results in quantity demanded decreasing to zero, and any decrease in price results in quantity demanded increasing to infinity

1. Perfectly inelastic (*p.e.d=0)*

This is where a given change is the price of the commodity does not affect quantity demanded of the commodity.

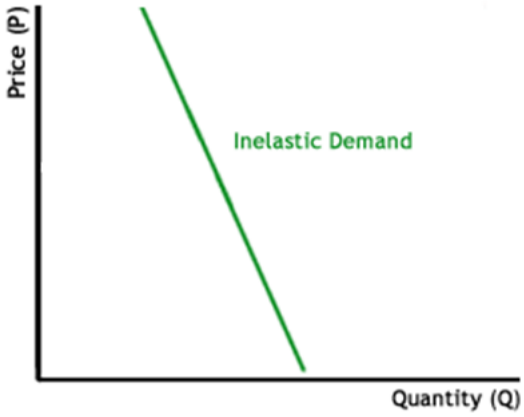
Diagram



2. Inelastic demand (*P.e.d<1)*

This is where a given change in price leads to a smaller proportionate change in quantity demanded.

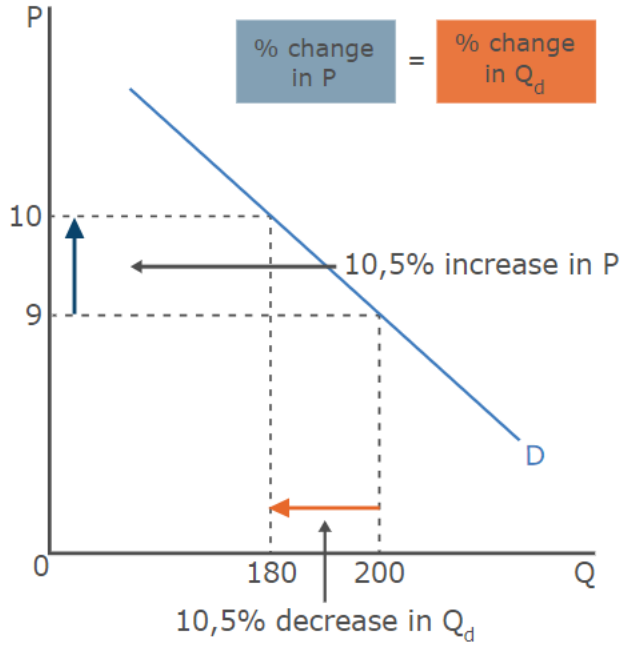
Diagram



3. Unit elastic demand (*P.e.d=1).*

This is where a given change in price leads to an equal change in the quantity demanded of the commodity.

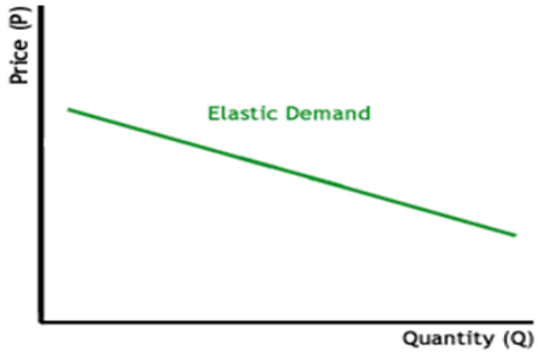
Diagram



4. Elastic demand (*P.e.d >1)*

Here a change in price leads to a more proportionate change in quantity demanded of the commodity.

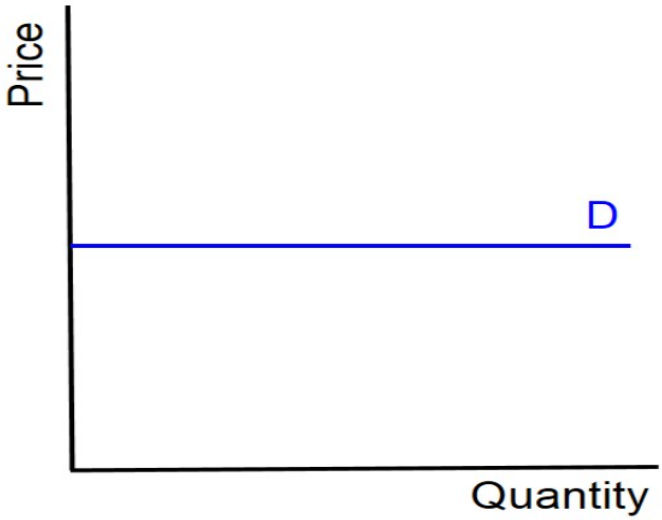
Diagram



5. Perfectly elastic (*P.e.d*= ∞)

This is where quantity demanded changes ***infinitely*** without a change in price. P.

Diagram



PRICE ELASTICITY OF DEMAND AND TOTAL REVENUE

Businesses, management consultants, and government bodies use price elasticities of demand a lot. To see why a business might care about the price elasticity of demand, let's consider how an increase in price might affect a business's total revenue, that is the selling price times the quantity of product it sells, or *PQ*. You might think that when the price rises, so will the total revenue, but a higher price will generally reduce the quantity demanded. Thus, the "benefit" of the higher price is offset by the "cost" due to the reduction in quantity, and businesses must generally consider this trade-off when they think about raising a price. If the demand is elastic (the quantity demanded is

relatively sensitive to price), the quantity reduction will outweigh the benefit of the higher price, and total revenue will fall. If the demand is inelastic (the quantity demanded is relatively insensitive to price), the quantity reduction will not be too severe, and total revenue will go up. Thus, knowledge of the price elasticity of demand can help a business predict the revenue impact of a price increase.

Factors that determine the size of price elasticity of demand (to be discussed in class)

- The level of addiction (habit forming goods).
- Nature of commodity – necessity, luxury
- Availability of substitutes commodities
- Proportion of income spent on a commodity
- The number of uses that commodity has
- Durability of a good
- Time period after a price change

CROSS-PRICE ELASTICITY OF DEMAND

The cross-price elasticity of demand for good *i* with respect to the price of good *j* is the ratio of the percentage change of the quantity of good *i* demanded to the percentage change of the price of good *j*:

$$\varepsilon_{QiPj} = \frac{\frac{\Delta Qi}{Qi} \text{ X } 100\%}{\frac{\Delta Pj}{Pj} \text{ X } 100\%}$$

Or, after rearranging terms,

$$\varepsilon_{QiPj} = \frac{\Delta Qi}{\Delta Pj} \text{ X} \frac{Pj}{Qi}$$

Where *Pj* denotes the initial price of good *j* and *Qi* denotes the initial quantity of good *i* demanded. Cross-price elasticity can be positive or negative. If $\varepsilon_{QiPj} > 0$, a higher price for good *j* increases the quantity of good i demanded. In this case, goods i and *j* are demand substitutes. If $\varepsilon_{QiPj} < 0$, a higher price for good *j* decreases the quantity of good i demanded. In this case, goods i and *j* are demand complements.

INCOME ELASTICITY OF DEMAND

The income elasticity of demand is the ratio of the percentage change of quantity demanded to the percentage change of income, holding price and all other determinants of demand constant:

$$\varepsilon_{Qy} = \frac{\frac{\Delta Q}{Q} \text{ X } 100\%}{\frac{\Delta Y}{Y} \text{ X } 100\%}$$

Or, after rearranging terms,

$$\varepsilon_{Qy} = \frac{\Delta Q}{\Delta Y} \text{X} \frac{Y}{Q}$$

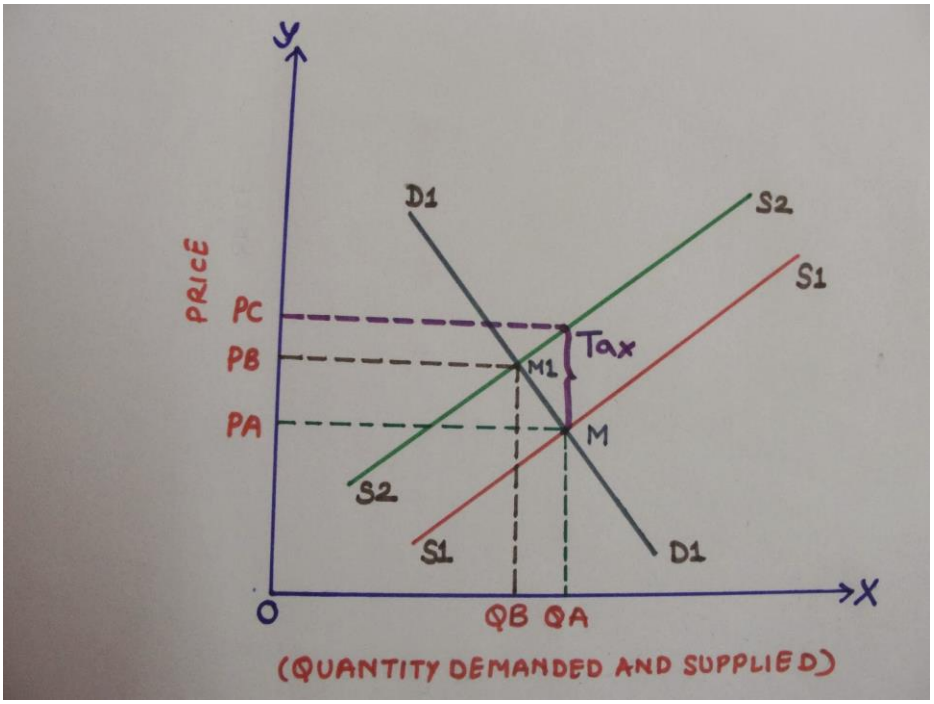
If income elasticity of demand is greater than one, demand for the item is considered to have a high-income elasticity. If, however, elasticity of demand is less than one, demand is considered to be income inelastic. Luxury items usually have higher income elasticity because when people have a higher income, they don't have to forfeit as much to buy these luxury items.

THE EFFECT OF TAX AND SUBSIDY ON EQULIBRIUM

Effect of a tax

The imposition of a tax results into increase in the cost of production. Other factors being constant, the supply curve will shift upwards to the left leading to an increase in price and a fall in ***quantity supplied*** as well as a ***contraction in quantity demanded***. The producer will transfer part of the tax to the consumer in form of increased prices. The proportion of tax paid by either the consumer or producer depends on the price elasticity of demand or supply for the commodity. For example if price elasticity of demand is ***elastic the producer*** would pay a larger proportion of the tax compared to the consumer and vice versa.

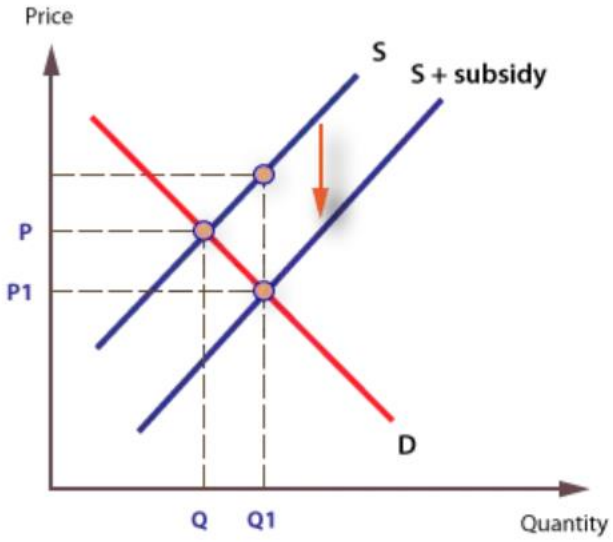
Diagram of a tax on equilibrium



The effect of a subsidy on equilibrium

A subsidy leads to a fall in the cost of production. The supply curve shifts to the right causing a fall in equilibrium price and an increase in quantity supplied and demanded. The producer will transfer part of the subsidy to the consumer and the share will still depend on the elasticity of demand or supply.

Diagram of a subsidy on equilibrium



Computations and example to be done in class