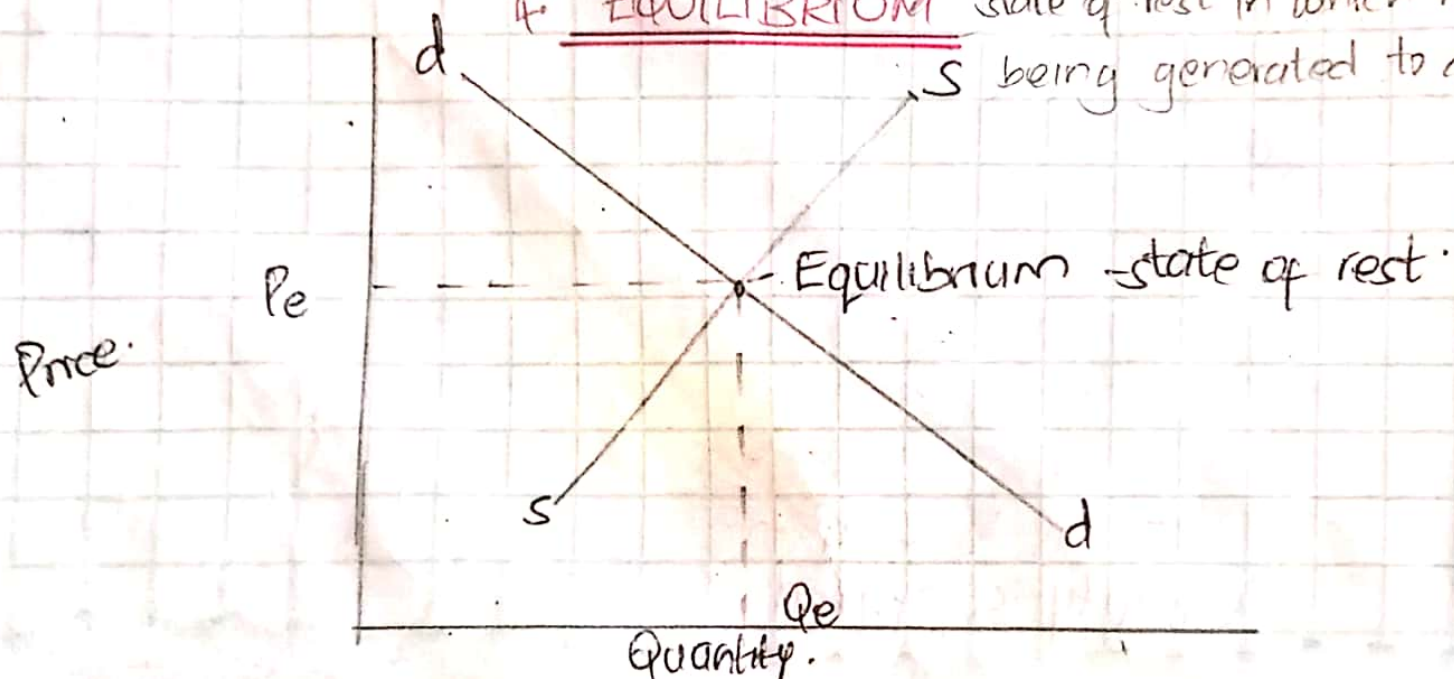


4. EQUILIBRIUM state of rest in which no economic forces are being generated to change the position.



- At price P_e the demand ~~for~~ & supply of the commodity Q_e are just equal.
- This is referred to as the equilibrium position.
- P_e is the equilibrium price & Q_e is the equilibrium quantity.
- At equilibrium both the producers & the consumers are satisfied & there is no pressure on the prices to change.
- Equilibrium can be defined as a state of rest (balance) in which no economic forces are being generated to change the situation.

May 2015 1d.

$$Q_d = 100 - 2P$$

$$Q_s = 50 + 5P$$

where Q_d = Quantity demanded

Q_s = Supply

P = rental price per house.

$$Q_d = Q_s$$

$$100 - 2P = 50 + 5P$$

$$100 - 50 = 5P + 2P$$

$$\frac{50}{7} = \frac{7P}{7} \quad P = 7.14$$

$$\text{Equilibrium price} = 7.14 \times 1000 = 7,140$$

$$\begin{aligned} \text{Equilibrium quantity} &= 100 - 2(7.14) = 85.72 \\ &= 50 + 5(7.14) = 85.7 \end{aligned}$$

~~85.7~~

$$100 - 2P = 50 + 5P$$

$$100 - 50 = 5P + 2P$$

$$\frac{50}{7} = \frac{7P}{7}$$

$$P = 7.14$$

$$Q_d = 100 - 2(7.14)$$

$$Q_s = 50 + 5(7.14)$$

$$Q_d = 85.72$$

$$Q_s = 85.7$$

$$\therefore Q_d = Q_s$$

May 2011 2a

Two commodities

$$A \quad Q_{dA} = 82 - 3P_A + P_B$$

$$Q_{sA} = -5 + 15P_A$$

$$B \quad Q_{dB} = 92 - 2P_A - 4P_B$$

$$Q_{sB} = -6 + 32P_B$$

ii)

$$Q_{dA} = Q_{sA}$$

$$= 82 - 3P_A + P_B = -5 + 15P_A$$

$$82 + 5 + P_B = 15P_A$$

$$87 + P_B = 15P_A$$

$$87 + P_B = 15P_A$$

$$P_B = 15P_A - 87$$

$$P_B = P_A = 49 - 18P_B$$

$$P_B = 15P_A - 87 \quad P_A = 49 - 18P_B$$

$$P_B = 15(49 - 18P_B) - 87$$

$$P_B = 882 - 270P_B - 87$$

$$P_B + 270P_B = 882 - 87$$

$$271P_B = 795$$

$$P_B = 2.93$$

$$Q_{dB} = Q_{sB}$$

$$= 92 - 2P_A - 4P_B = -6 + 32P_B$$

$$= 92 + 6 - 2P_A = 4P_B + 32P_B$$

$$= 98 - 2P_A = 36P_B$$

$$= 2P_A = 36$$

$$= 2P_A = 98 - 36P_B$$

$$\frac{2}{2} \quad \frac{98 - 36P_B}{2}$$

$$= P_A = 49 - 18P_B$$

$$P_A = 49 - 18P_B \quad P_B = 15P_A - 87$$

$$P_A = 49 - 18(15P_A - 87)$$

$$P_A = 49 - 270P_A + 1566$$

$$P_A + 270P_A = 49 + 1566$$

$$271P_A = 1615$$

$$P_A = 5.96$$

$$P_A = 49 - 18(18P_A - 87)$$

$$P_A = 49 - 324P_A + 1566$$

$$P_A + 324P_A = 49 + 1566$$

$$\frac{325P_A}{325} = \frac{1615}{325}$$

$$P_A = 4.969$$

$$Q_{dA} = 82 - 3P_A + P_B$$

$$Q_{dA} = 82 - 3(4.969) + 2.44$$

$$Q_{dA} = 84.44 - 14.907$$

$$Q_{dA} = 69.533$$

$$Q_{sA} = -5 + 15P_A$$

$$Q_{sA} = -5 + 15(4.969)$$

$$Q_{sA} = -5 + 74.535$$

$$Q_{sA} = 69.535$$

$$P_B = 18P_A - 87$$

$$P_B = 18(4.969) - 87$$

$$P_B = 2.44$$

$$Q_{dB} = 92 - 2P_A - 4P_B$$

$$Q_{dB} = 92 - 2(4.969) - 4(2.44)$$

$$Q_{dB} = 92 - 9.938 - 9.76$$

$$Q_{dB} = 72.3$$

$$Q_{sB} = -6 + 32P_B$$

$$Q_{sB} = -6 + 32(2.44)$$

$$Q_{sB} = -6 + 78.08$$

$$Q_{sB} = 72.08$$

i) Relationship between two commodities A & B.

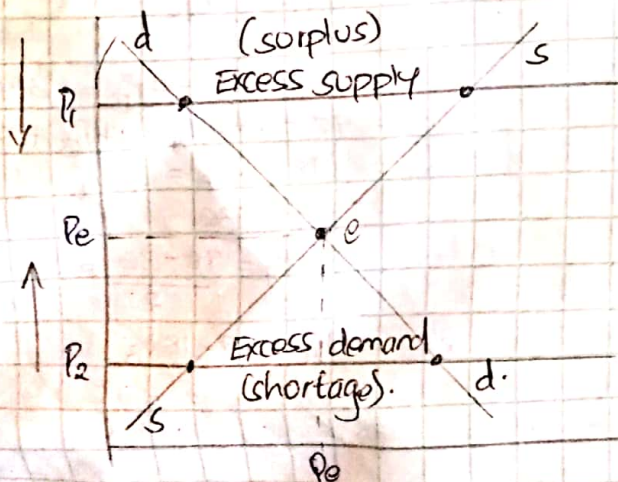
P_A	Q_{dB}	P_B	Q_{dA}
1	80.24	1	68.093
2	78.24	2	69.093
3	76.24	3	70.093
4	74.24	4	71.093

If price for commodity A increases the quantity demanded for commodity B decreases hence they are complements.

Types of Equilibrium

i) Stable Equilibrium.

An equilibrium is said to be stable when the economic forces push the price towards the equilibrium. i.e. any divergence from the equilibrium position sets up forces that tend to restore equilibrium.

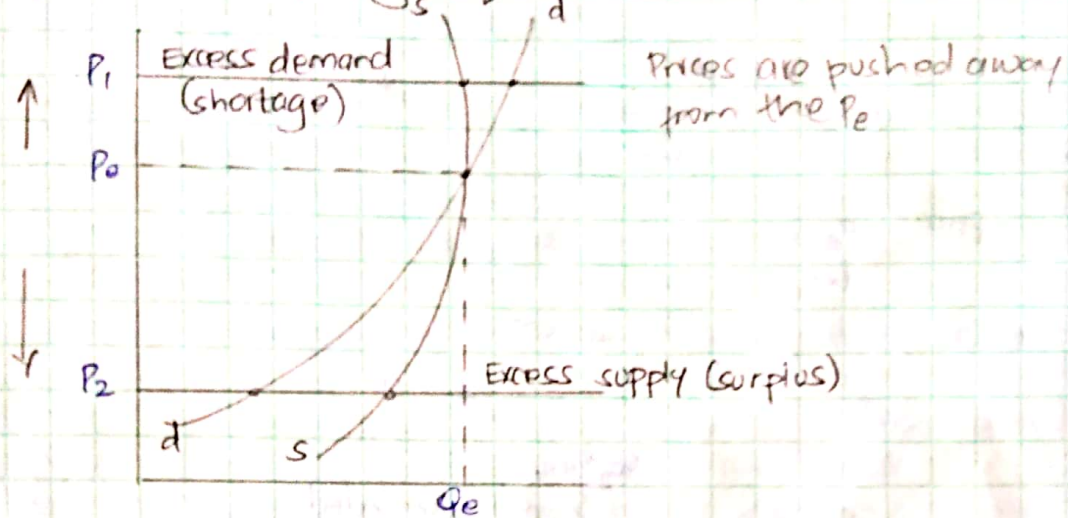


Economic forces push the price towards the equilibrium.

18 APR

- At price P_1 there will be an excess supply i.e. surplus
- Producers may ^{then} react to this by lowering their prices so as to sell off their unsold stocks.
- At Price P_2 there will be an excess demand i.e. shortage.
- In this case, the price of the product will rise ~~and~~ competition among the buyers.

ii) Unstable Equilibrium / Knife Edge Equilibrium.

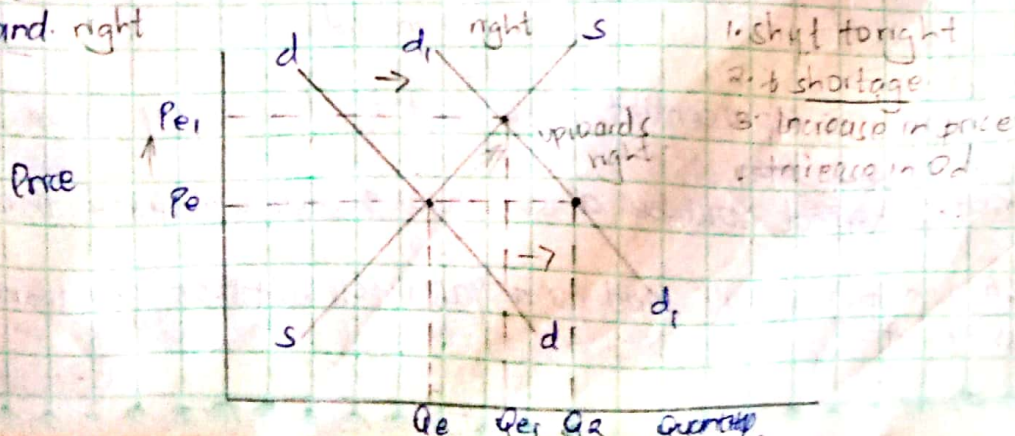


- An equilibrium is said to be unstable if any divergence from the equilibrium position sets up forces that push the price further from the equilibrium price (eg a giffen good which assumes a demand ~~Agg~~ curve with a positive slope).
- At P_1 there is excess demand & this will exert an upward pressure on the prevailing market price thus pushing the price further away from the equilibrium.
- At P_2 there is an excess supply & this will exert a downward ^{pressure} on the prevailing market price thus pushing the price further away from the equilibrium.
- This form of equilibrium is also referred to as knife edge equilibrium as a small change in price sends the sys far away from the equilibrium.

Effects of Shifts of Demand and Supply on the Market Equilibrium.

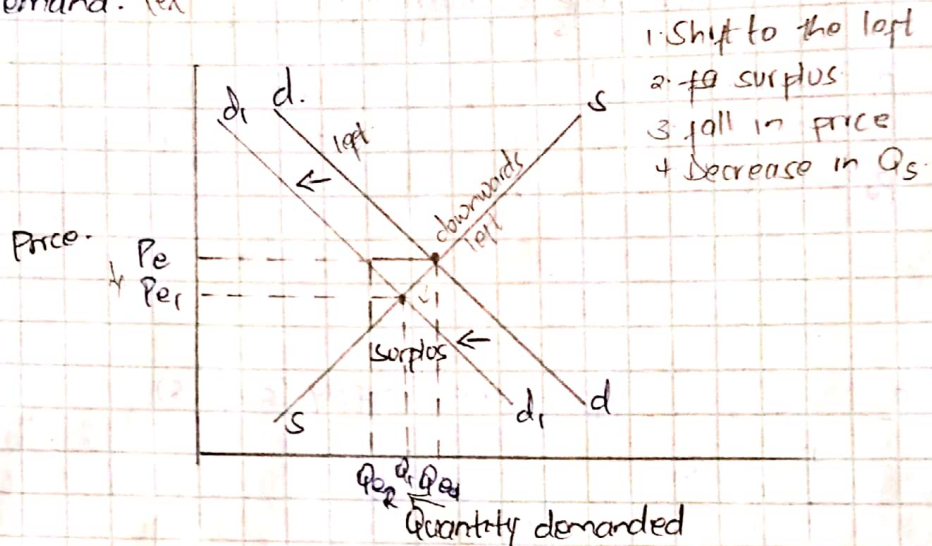
i) Shifts in Demand.

a) Rise in demand. right



- An increase in demand is represented by a shift of the demand curve to the right from d, d_1 .
- The immediate effect will be a shortage & this in turn will lead to an increase in prices.
- An increase in price will lead to an increase in the Q_d until equilibrium is established at P_{e_1} .

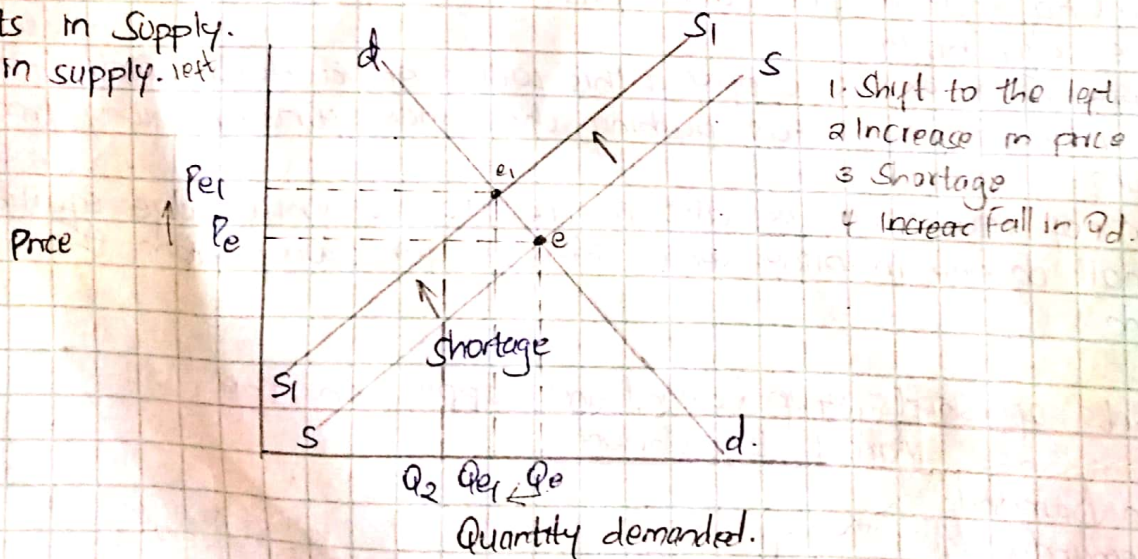
b) Fall in demand. left



- A fall in demand is represented by a shift of the demand curve to the left i.e. from d, d_1 .
- The immediate effect will be a surplus & this will make the producers to lower their prices in an attempt to get rid of excess stock.
- A fall in price will lead to a fall in Q_s until a new equilibrium is established.

i) Shifts in Supply.

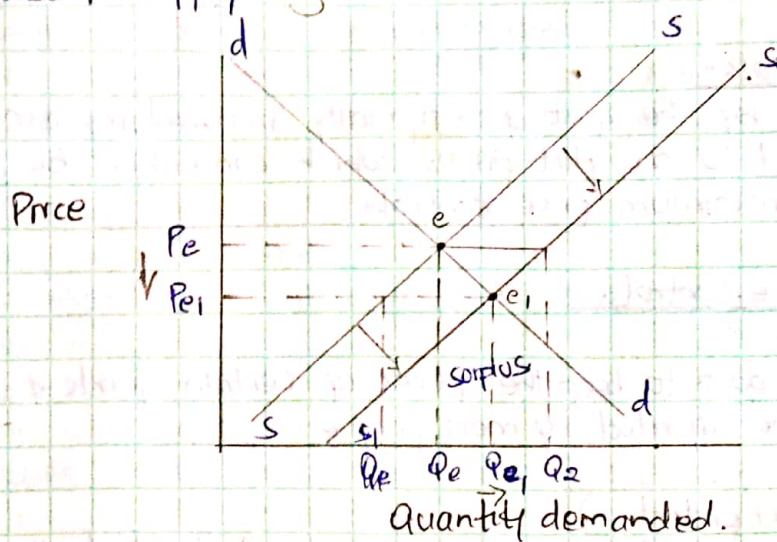
a) Fall in supply. left



- A fall in supply is represented by a shift of the supply curve to the left i.e. from S, S_1 .
- The immediate effect will be a shortage & this will force the prices to go up.
- An increase in price will lead to a fall in Q_d until an equilibrium is established at P_{e_1} .

CONCEPT OF EQUILIBRIUM

b) Increase in supply. right

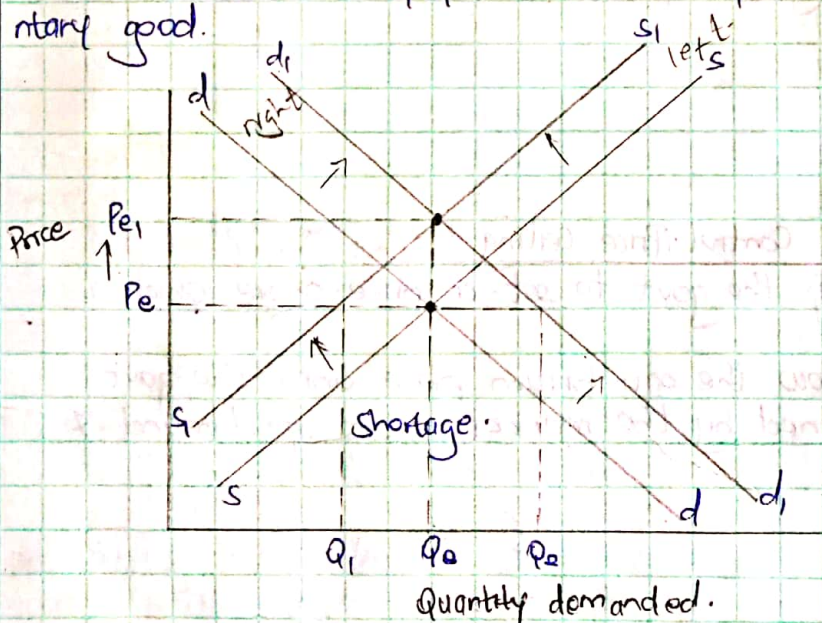


1. Shift right
2. A fall in price
3. Surplus
4. Increase in Q_d until an equilibrium

- An increase in supply is represented by a shift of the supply curve to the right i.e. SS to S_1S_1 .
- The immediate effect will be a surplus & this will force the firms to lower their prices in order to get rid of the excess stock.
- The fall in price will lead to an increase in Q_d until an equilibrium price is established at Pe_1 .

Multiple shiftsC.O.P. ↑
complementary goods

Consider the diagram below which illustrates the effects of a simultaneous increase in the cost of production & a fall in the price of a complementary good.



Increase in C.O.P. = shift of SS curve to the left = shortage = increase in price = decrease in Q_d .

Fall in the price of a complementary good = dd curve shifts to the right = shortage = increase in price = fall in Q_d = equilibrium.

- An increase in the cost of production will lead to a fall in supply. This is usually represented by a shift of the supply curve to the left from SS to S_1S_1 .
- The fall in the price of a complementary good will lead to an increase in demand. This will lead to a shift in the demand curve to the right from dd to d_1d_1 .

As a result the market will be in a state of shortage causing the price to rise from P_e to P_c .

deliberate measure by govt of artificially imposing prices

Price Controls: flat prices

This is the deliberate measure by the govt, of artificially imposed prices. Such prices are referred to as flat prices which can either be a maximum price control or a minimum price control.

Reasons/Advantages of Price Control.

1. Cheapness (Consumer protection).
It may be the objective of the govt to keep the prices of certain goods & services at a level at which they can be afforded by most people.
2. Maintenance of Income (Producer protection).
The govt. may keep the incomes of the producers at a level at which there will be reasonable.
3. Price stability.
If there is a wide variation in the prices of a commodity year after year the govt may wish to iron out these variations for the interest of both the producers & the consumers.
4. Prevent inflation
Can be used as one of the counter inflationary measures to combat the necessary effects of inflation.
inflation persistent rise in the general price levels.
5. Industrial peace.
Minimises strikes and unrest.

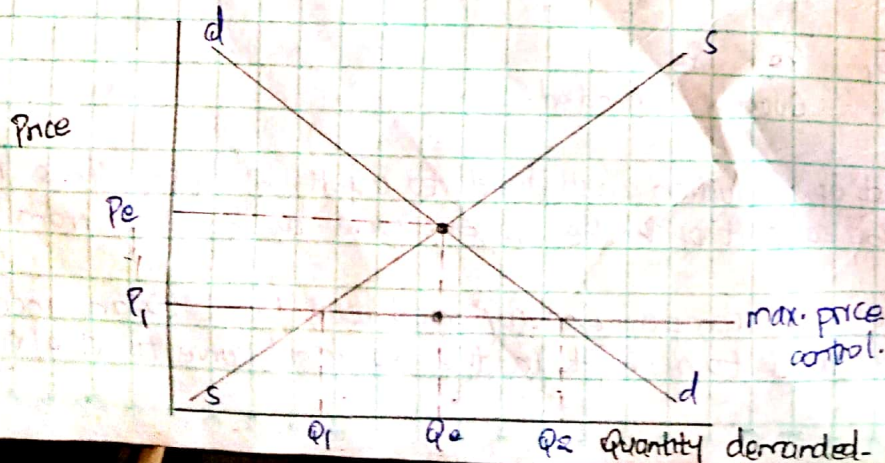
Below P_e .

Maximum Price Control: Price Ceiling

Price above which a good or service cannot be sold

This refers to the action taken by the govt to set a price above which a good or service cannot be sold.

They are normally imposed below the equilibrium price since the govt feels that the prices determined by the market forces of demand & supply are too high.



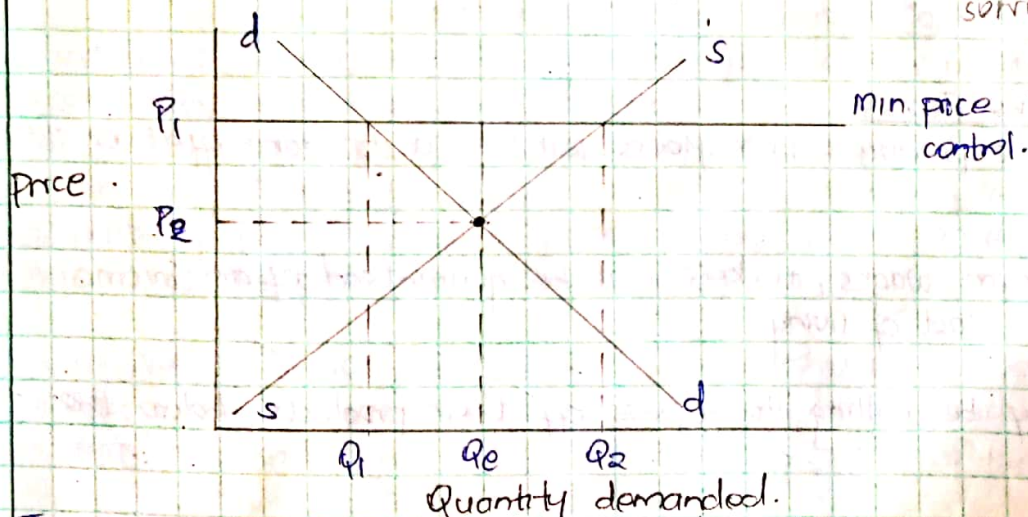
If the govt imposes a price ceiling given by P_1 , there will be excess demand / shortage - Q_1, Q_2

- Under normal circumstances, economic forces of excess demand would exert an upward pressure on the prices. In this case the prices cannot go above P_1 since they are controlled by the govt.

Other effects of Price Ceilings - Maximum Price Control.

1. Rise of Black markets
Commodities will be sold above the legal price or even above the equilibrium price.
2. Chronic shortages.
Producers move away from the price controlled lines of production.
3. Research & Development -
It will be encouraged since producers move away from the price controlled industries.
4. Increased cost efficiency in production
Firms increase cost efficiency by cutting down costs to gain profit.
5. Low investments.
This is due to reduced profits.
6. Excess demand / shortage of goods & services

Above P_e Minimum Price Controls / Price Floors. Price below which a good or service cannot be sold



- This refers to the action taken by the govt to set a price below which a good or a service cannot be sold.

They are normally imposed above the equilibrium price since the govt feels that the price determined by the market forces is too low.

- If the govt imposes a min price of P_1 , the immediate effect will be a surplus equal to Q_1, Q_2 .
- Under normal circumstances, these economic forces of excess supply will exert a downward pressure on prices.

Question

Given that $q = \frac{1}{2}P_2 = Q_2$
Use the data in the table below to compare income elasticity of demand, through the arc elasticity method.

Quantity units
100
120

Income sh
5000 1
6000 2

Price sh
16
16

$$\text{Arc elasticity} = \frac{\Delta Q}{Q} \frac{\Delta P}{\Delta P} = \frac{P_1 + P_2}{Q_1 + Q_2}$$

$$\frac{\Delta Q}{\Delta P} = \frac{100 - 120}{16 - 16} = \frac{-20}{0}$$

$$= \frac{-20}{0}$$

$$\frac{P_1 + P_2}{Q_1 + Q_2}$$

$$\frac{16 + 16}{100 + 120}$$

$$\frac{-1}{-20} = \frac{5.33}{32} = -1 \times 5.33 = -5.33$$

$$\frac{\Delta Q}{\Delta P} = \frac{P_1 + P_2}{Q_1 + Q_2}$$

$$\frac{100 - 120}{6000 - 5000} = \frac{-20}{1000}$$

$$= \frac{5000 + 6000}{100 + 120}$$

$$= \frac{11000}{220} = 50$$

$$\frac{\Delta Q}{\Delta P} = \frac{P_1 + P_2}{Q_1 + Q_2}$$

$$\frac{20}{11000} = \frac{1}{550} = 0.0018$$

$$\frac{120 - 100}{6000 - 5000} = \frac{20}{1000} = 0.02$$

$$0.02 = \frac{5000 + 6000}{100 + 120}$$

$$\frac{20}{11000} = \frac{1}{550} = 0.0018$$

$$0.02 = \frac{50}{11000} = 0.0045$$

Other effects of Price floors

1. In case of low income producers, price floors will have a stabilising effect on the income.
2. In the case of minimum wages, workers will be guaranteed of an income compatible with the cost of living.
3. Some producers may be willing to dispose off their products below the min. legal price.
4. In the case of minimum wage rates, this will lead to an increase in unemployment.
5. Excess supply / surplus of goods & services.

Disadvantages of Price controls.

1. Expensive to enforce.
1. Rise to shortages
There is shortage of commodities in the economy which leads to a rise in black markets.
2. Expensive to enforce.
ie the govt will have to incur an extra cost to implement the system.
3. Excess supply.
In the case of min-wage legislation, there is increased unemployment.
4. Closure of less efficient firms.
They cease production.
5. Shift of resources
Mostly to the production of luxuries which may not be subject to price control.

prices fixed by state to prices fixed by market prices EFFECTS OF PRICE LIBERISATION / PRICE DECONTROL.

- Decontrol (Price liberalisation) refers to a transition from a system where the prices are fixed by the state to a system where the prices are determined by the market forces of demand & supply.
 - Such a transition will have the following consequences
1. In industries which were subject to price ceilings, prices may initially rise as they had been fixed below the equilibrium price. This implies that the consumers will have to pay more for the commodities.
Increase in price $\rightarrow$ Increased investments
 2. Because of the increase in prices, investments in these industries will increase as the price is more realistic.
 3. In the long run, price decontrol is likely to lead to more efficient long run allocation of resources since there will be no surpluses or shortages because the market for the commodity will get into the equilibrium.
Efficient allocation of resources
 4. Decontrol of ~~max~~ min. price controls will lead to increase in fluctuation of producers income esp in the agricultural sector.
 5. Decontrol of min. wages will lead to a fall in the wages & an increase in the employment levels.

PRICE DETERMINATION IN AGRICULTURE

Role of Agriculture in the Economy.

Creation of employment

1. Source of income for
1. Creation of employment.
2. Source of input for industries.
3. Provides a market for industrial goods.
4. Improves climate/weather.
5. Food security ie no need to import food.
6. Source of revenue through taxation.
7. Earns foreign exchange for country when exported.

Employment

Input

Market

Food security

Revenue

Foreign exchange.

Problems Facing the Agricultural Sector.

1. Price volatility / Price instability.
2. Low prices of agricultural products
3. Competition from synthetic materials.
4. Perishability of agricultural produce.
5. Seasonality of production - dependence on rain fed production.

Price Instability

Low prices

Competition

Perishability

Seasonality

Causes of Price Fluctuations of Agricultural Produce.

1. Natural forces; the supply for agricultural products is more directly affected by natural forces such as weather, pests, diseases etc than supply of industrial products. - in agriculture, there is a divergence between the planned & the actual output.
- The position of the supply curve will depend on whether the harvest is good or bad.
2. Perishability.
- Most agricultural products such as vegetables, fruits, milk, flowers etc are often perishable.
- Price fluctuations depend on the degree to which it is possible to store the product.
- A sharp rise in price can be prevented by sales from the stock.
3. The short run, there will be an inelastic ^{supply} demand since once a given crop has been planted, it will be difficult to increase or decrease the resulting output.
4. The effects of fluctuations in price are worsened by the fact that the demand, esp for foodstuffs, tends to be price inelastic.
5. Equilibrium prices are difficult to attain in the agricultural sector because of the lagged responses by producers to change in price leading to the cob-web theorem.

APPLICATION OF DISEQUILIBRIUM ANALYSIS.

A very simple model which enables us to trace out a fine path from a disequilibrium pattern towards an equilibrium position given that the presence of a production lag is the so-called cobweb Theorem.

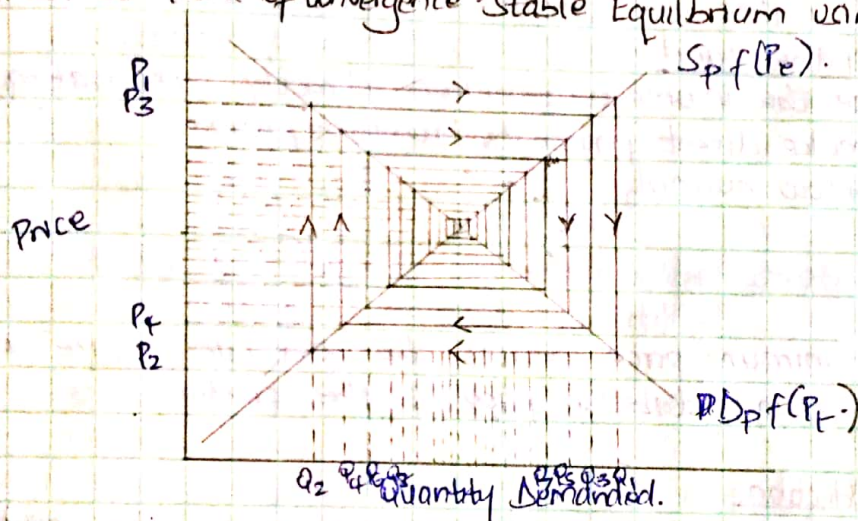
This was originally used to analyse the market for hogs/pigs in the USA. Suppose that the demand for hogs depends on this year's supply depends on last year's price. This is not reasonable because if the prices were high, last year's farmers would have reared more pigs/hogs in expectation of high prices this year. If the prices were low last year farmers would have reared fewer pigs in expectation of lower prices and $\therefore$ using formulae notation.

$$D_p = f(P_t)$$

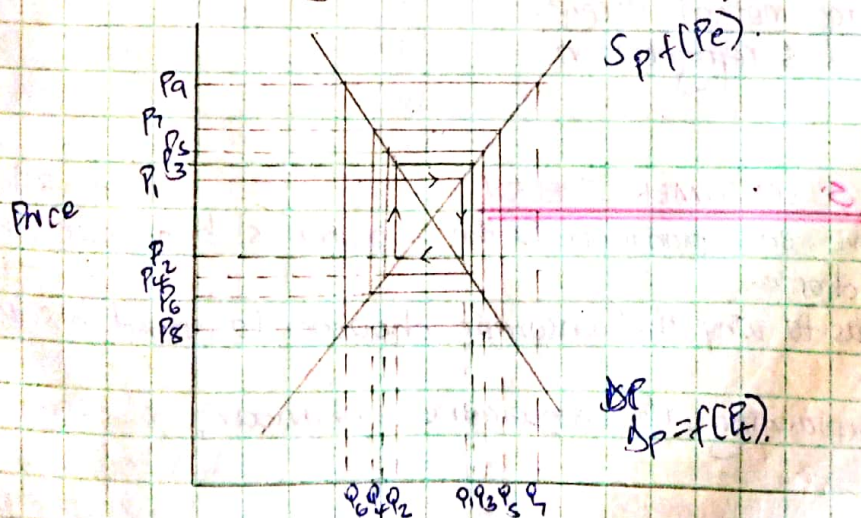
$$S_p = f(P_{t-1})$$

P_t - current year price
 P_{t-1} - last year's price.
 $P_t = P_{t-1}$

Damped cobweb | Zone of Convergence - Stable Equilibrium using Cobweb $S_p f(P_{t-1})$.



Explosive cobweb. Divergence zone - Unstable Equilibrium using a cobweb.



- Suppose that we start with year 1 with a disequilibrium price P_1 the quantity supplied in year 2 which depends on the price of year 1 will be Q_2 however to sell this quantity of pigs, the price in year 2 will have to be reduced to P_2 .
- This price brings forth a supply of Q_3 in year 3 however, this quantity can only be sold at a higher price of P_3 and this will bring forth a supply of Q_4 in year 4.
- This process will continue year after year tracing out a cobweb pattern on the graph with the market slowly approaching the equilibrium.

Government Actions to Stabilise Incomes and Prices of Agricultural Produce.

1. Buffer Stock

- In this case, the govt buys part of the supply when the output is excessive, stores this supply & presents it to the consumers on times of shortages.
- These will ensure that the supply for the commodity is constant throughout the year & consequently this will stabilise the prices to an operation of a fund.
- 2. Operation of the fund.
- The govt can stabilize the income of producers directly by operating a fund from which it can make direct payments to the farmers.
- When incomes fall below normal,

3. Price controls

Through the use of minimum price controls, the govt can ensure adequate income to the producers and stabilise price of the produce.

4. Diversification of production

The farmers can be encouraged to produce a variety of crops so that if the price of one crop fluctuates, the farmers income will be compensated by the prices of other crops.

5. Better production & storage methods of crops. eg use of green houses & refrigeration