

may not be immediately ready to accept a lower wage, ~~and during this time~~ and as long as real wage remains high, the producers will be able to produce and sell less, and unemployment will arise. Gradually, labour will accept the lower wage so that everybody is employed.

not

- Initially they will accept because they are guided by Money Loosen, i.e. they think higher wage is always beneficial. But at the end we attain the full employment output Y_t .

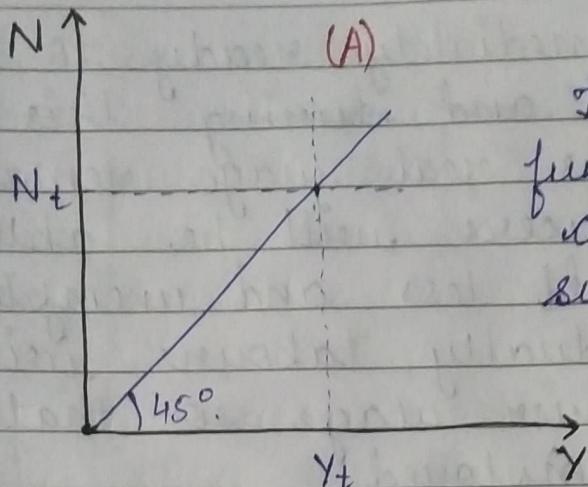
* Perfectly Elastic Aggregate Supply curve till ~~to~~ full employment level (Keynsian case)

- In this case Aggregate supply curve is perfectly elastic till full employment is reached and after that it is perfectly inelastic.

• Assumptions:

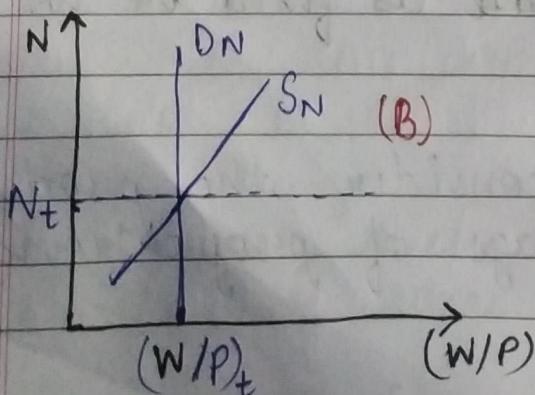
- Money wage rate ~~rate~~ is fixed i.e. w .
- MPL is constant.

- In this case, we consider the production function in the stage of proportional returns.

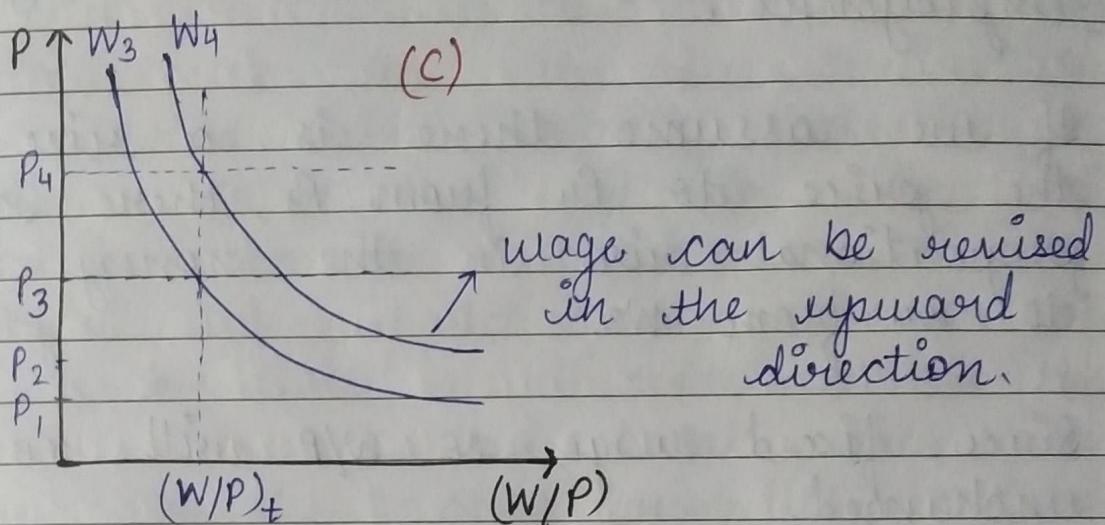


This ~~the~~ is the production function from which we derive the aggregate supply curve.

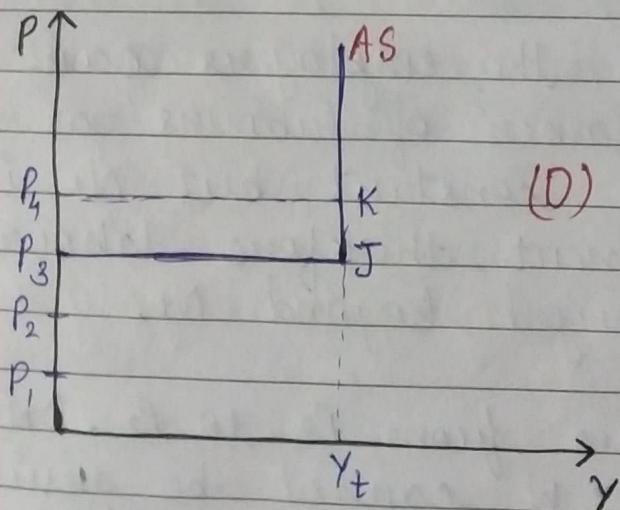
- Increase in output will be proportional to the increase in labour, i.e. MPP_L will remain constant as slope of the production function is 1.
- And as the demand curve is the MPP_L , \therefore demand curve will be a vertical straight line. i.e. ~~any number of~~
- Production funcⁿ is a 45° line so that each ~~s~~ increment in labour employed produces same increment in output.
- MPP_L is the DN curve of labour.
- If DN & S_N intersect there is full employment (N_t) of labour.



- At full employment level (W/P) is at $(W/P)_t$, N is at N_t and Y is at Y_t .
- $\therefore Y_t$ is the full employment output.



- At $(W/P)_t$ wage rate, wage is W_3 & price is P_3 .
- Fixed money wage is at W_3 in part C and Price is at P_3 in part D.
- That leads to point J in D. It is the full employment level of output.



- Full employment level implies that all those who are willing to work at the present wage rate are employed, ∴ there is no scope of increasing employment.
- If we assume there is a rise in the price to P_4 from P_3 , there can be proportional rise in the money wage to W_4 from W_3 .
- Since fixed wage, so W/P will remain unchanged.
- With $P_4 & Y_t$, it indicates that this rise in price will take AS to point K, which is an inelastic point.
- As there is no change in output, only price is rising, ∴ there is inflation in economy i.e. only the general price level is rising.
- In this ~~case~~ case, the employers can employ any number of labours as long as (W/P) remains constant but N_t is the full employment, therefore labours cannot be employed beyond N_t .
- If price declines from P_3 to P_2 , ~~as~~ as money wage W cannot be revised

in the downward direction, ~~real wage~~ will remain fixed at W_3 . (W/P) will increase as W remains unchanged and P decreases. \therefore real wage is tending to rise.

- DN curve being perfectly elastic at a given $(W/P)_t$, any fall in price with W fixed makes the supply of labour excess. i.e. ~~suppl~~ Employers can hire any amount of labour at real wage $(W/P)_t$ but at any real wage greater than this, it can bring the employment down to zero.
- At any price below P_3
- The aggregate supply curve becomes horizontal at value P_3 until full employment is reached.
- In reality, the aggregate production function is more or less linear and MPP_L may be constant at low level of output and employment. i.e. proportional return is the first stage of production.
- And as employment increases \therefore diminishing return stage of production func' is reached.

- Constant MPP_L implies that if an additional unit of labour is employed, then the amount of ~~product~~ output contributed by this additional unit is the same as the amount contributed by the preceding unit.
- And the ~~wage rate~~ wage rate is fixed, so there is no reason for the firm to change the price until full employment is reached. Employers will keep demanding labour to increase output until full employment is reached.
- But once full-employment is reached, output cannot be increased further as full employment has been reached. ∴ supply of ~~more~~ output will remain constant.
- ∵ after Y_t amount of supply of good, if demand of output further rises, then there will be increase in price level of the output but there will be no change in supply of the output.

* Summing up the Aggregate Supply Function

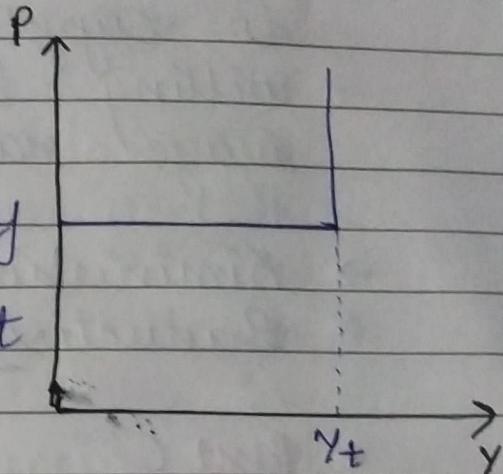
- Part A
- Keynesian case

AS is perfectly elastic up to the full employment level of output. This form of AS is on which Keynesian Model is based.

Basic Assumptions:

→ Money wage rate is fixed.

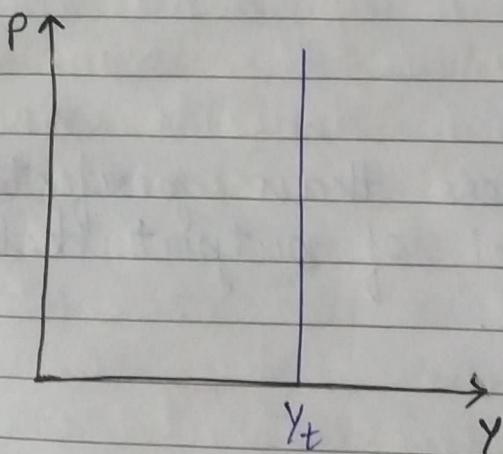
→ Marginal Physical productivity of labour is constant up to full employment that is Y_t .



Part B

(classical case)

AS is perfectly inelastic throughout and positioned at full employment level of output. It is based on the simple classical model.



Assumptions:

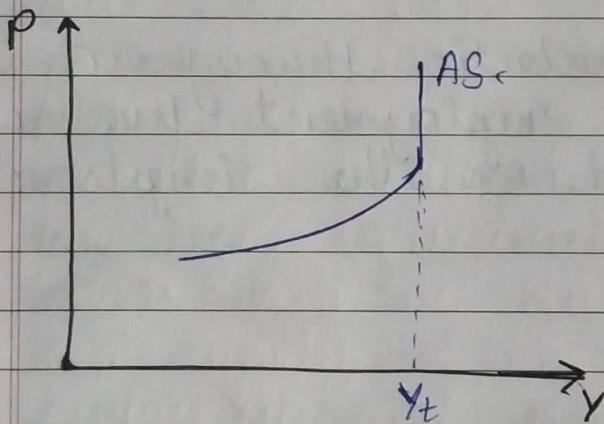
→ Money wage is completely ~~fixed~~ flexible downward and falling without limit in the event of an excess supply of labour.

i.e. if supply of labour is greater than the demand for labour, money wage has the tendency to fall without limit until demand of labour becomes equal to supply of labour or all the people willing to work at the existing wage rate are employed.

- Diminishing Marginal ~~and~~ Physical Productivity of labour.

• Part C

(Intermediate case)



AS curve becomes less than perfectly elastic at some level of output below full employment level.

Basic Assumptions:

- Money wage is fixed.
- Diminishing Marginal Physical productivity of labour before the full employment

level of output (Y_t) is reached.

- * We are trying to find out equilibrium output under classical framework.
In order to find out eq. output we need:

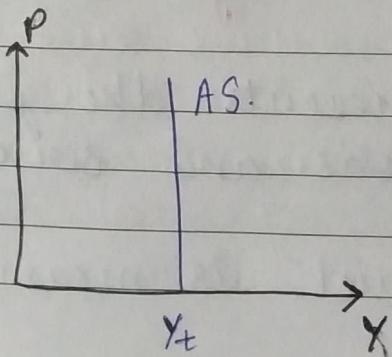
- i) Aggregate supply curve for output
- ii) Aggregate demand curve for output

- * In order to find out aggregate supply curve of output we need:

- a) Nature of production funcⁿ a/c to classical economics (diminishing return)
 - b) Demand curve for labour (-vely sloped)
 - c) Supply curve for labour (utility maximizing principles applicable to consumers).
 - d) Flexible money usage curve.
- ~~flexible~~

- * Derivation of the Aggregate Demand for Output: Quantity theory of money and price level.

The Classical model yields a perfectly inelastic AS curve at the output level that is consistent with the full employment.



This curve specifies what output level must be in this model. It does not specify which of the various price levels along this supply curve will be the prevailing price level.

Classical theory relied on the quantity theory of money.

* Quantity theory of Money

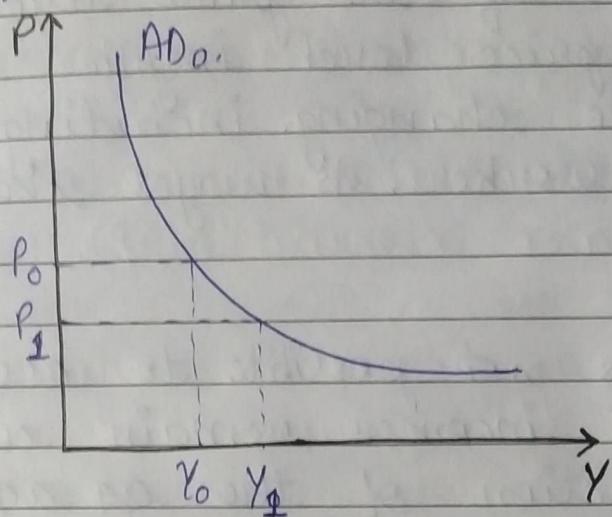
- The quantity of money in the hands of the public determines how high or low the price level will be.
- Money is anything that is generally accepted by the public in payment for goods, services and other valuable assets and in discharge of debts. Therefore the supply of money is the sum of currency and demand deposits and for every country, it is controlled by an apex bank e.g. Reserve Bank for India.

Aggregate Demand (AD) for output

- The vertical axis represents the price level of all final goods and services.
- The aggregate price level is measured

by either the GDP deflator or the CPI.

- the horizontal axis represents the real quantity of all goods and services purchased as measure by the level of real GDP.



- The aggregate demand curve, AD , like the demand curves for individual goods, is downward sloping, implying that there is an inverse relationship between the price level and the quantity demanded of real GDP.
- Reasons for the downward-sloping aggregate demand curve v/s demand curves for individual goods and services.
- The demand curve for an individual good is under the assumption that buyer's incomes remain constant. As the price of good X rises, the demand for good X

falls because the relative price of other goods is lower and because ~~buy~~ buyers' real incomes will be reduced if they purchase good X at the higher price.

- The aggregate demand curve, however, is defined in terms of the price level. A change in the price level implies that many prices are changing, including the wages paid to workers. As wages change, so do incomes.
- Consequently, it is not possible to assume that prices and incomes remain constant in the construction of the ~~an~~ aggregate demand curve. Hence, one cannot explain the downward slope of the aggregate demand curve using the same reasoning given for the downward-sloping individual product demand curves.

The aggregate demand

- The demand curve for a good is based on the income effect & the substitution effect ~~&~~ on the product. This is the micro-economic approach for deriving the individual demand curve and finally extending the logic to derive the aggregate demand curve.

* Exchange Equation

- Money supply and price levels. The exchange equation is:

$$\cancel{M \times Y} = MV = PY$$

- $M \rightarrow$ Supply of money

Money is demanded only for the transaction and precautionary purpose that depends on the income level. Changes in the money supply and changes in the price level are directly proportional.

- $M = \text{Currency} + \text{Demand deposits}$.

- The custodian of this money supply is the apex bank of the country. This money supply is assumed to be fixed. It is a stock variable not a flow variable (like income).

- $V \rightarrow V$ is the velocity or the number of times it turns over in the purchase of final goods (how a single rupee contributes to GDP)

It is measured by how many times, money changes hands in an economy in a particular time period. To purchase final goods and services.

- PY → Monetary value of the output
- P → Price level of the output
(Average price)
- Y → Income.
It is also the real output i.e. real physical output e.g. quintals of paddy, etc.
- $PY \rightarrow Price * Quantity \rightarrow$ Monetary value of output (It is also nominal GDP).
- In classical theory, money is considered as a medium of exchange.
Classical
- In Keynesian theory, people demand money for 2 purposes: transaction & precautionary purposes.
- Demand for money is not the same as supply for money. Supply for money is decided by the apex bank.
- Money demand - How much money is kept as ideal balances among people.
- Money is supplied by the apex bank & demanded by the people because people like to maintain an ideal balance.
- The money people carry for day-to-day

transactions, it is the demand for money or the liquid money.

- Money is the most liquid asset.

- Why do people prefer liquidity over illiquidity?

Because people prefer liquidity for transaction purposes. Means of transaction other than money are difficult.

- Precautionary purposes - To tackle with unforeseen contingencies like natural calamities, etc.
- Keynes added one more demand called speculative demand for money, people prefer liquidity over illiquidity to respond to bond prizes e.g. those who wish to spend in stock markets, they are guided by speculation.
- In classical theory, money is treated only as a medium of exchange, it has no other purposes to meet.
- Y and V are constant or stable in the short run and P is passive which depends on changes in M . ~~depends on changes in M~~ does not depend on the changes in P .

- Y is considered constant, because in classical theory, we consider the full employment output, therefore, there is no scope for output to rise beyond full employment.
- * Full-employment is achieved in the long run, but Y can still be considered stable in the short run, because even in the short run, if all the ~~resources~~ resources are fully employed, then output cannot rise.
- V depends on many factors:
 - (i) Technological advancement in the economy
 - (ii) Cultural makeup in the economy, etc.
- If P increases if M increases, P will increase & if M decreases, P will decrease.
- There is a proportional relation b/w M & P .
- Growth rate of ~~money~~^{price} level is proportional to growth rate of money supply. when Y & V are constant i.e. $G_P = G_M$
- When Y & V are constant, the rise in price level is proportional to rise in money supply.

- Increasing or decreasing the money supply will cause the price level of output to rise or fall proportionally but the level of output itself will remain unchanged at the full employment level.
- Any change in the money supply that is accompanied by a change in the velocity of money will break the proportional relationship between money and price.
- It will still leave the level of output and employment unaffected by changes in either money or velocity.

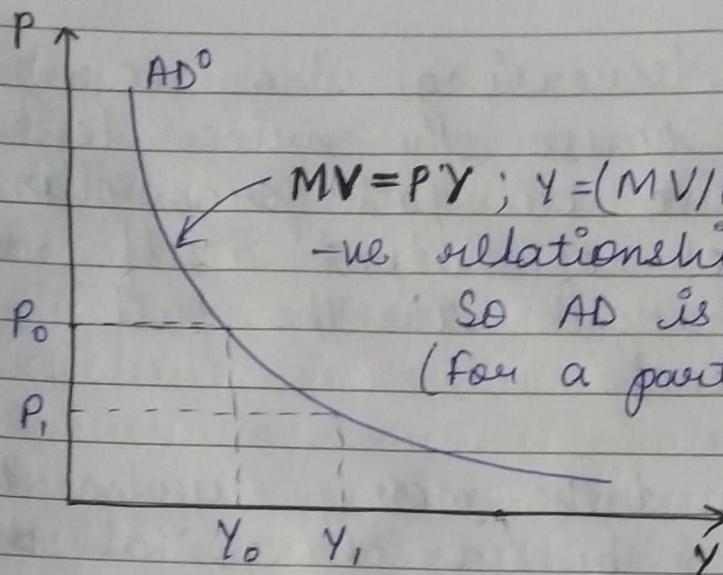
~~PY → GNP~~

$$V = \frac{PY}{M}$$

$$P = \frac{MV}{Y}$$

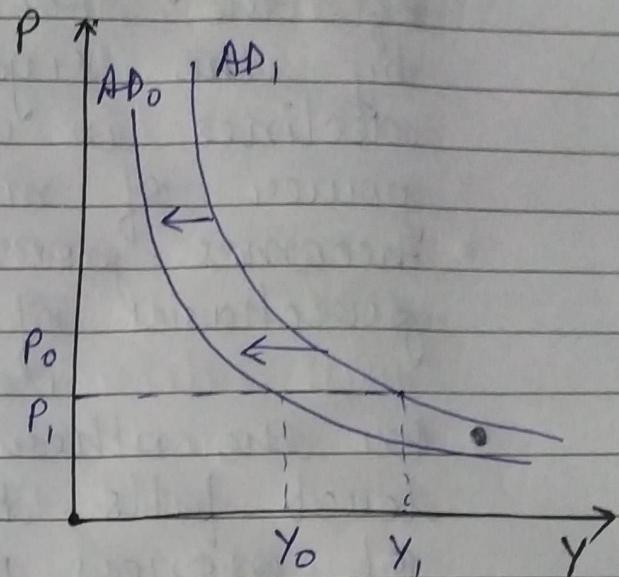
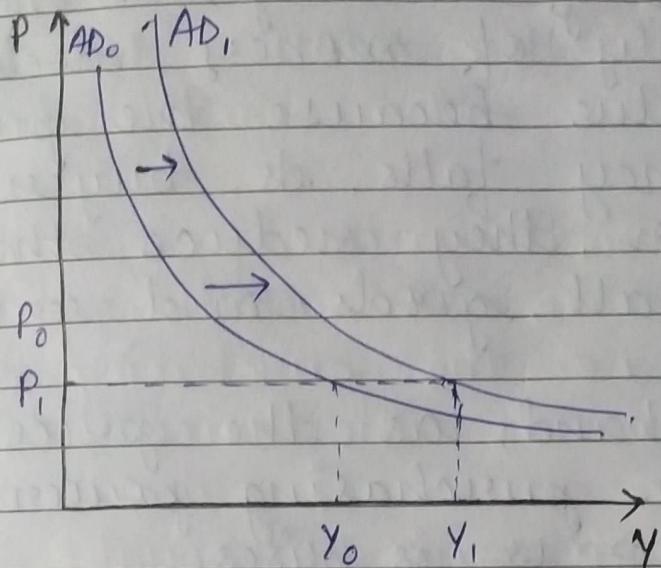
$$V = \frac{GNP}{M}$$

- The quantity theory of money, also shows that the AD curve should slope downward.
- The quantity theory ties money to prices and output via velocity, the average number of times annually a unit of currency is spent on final goods and services.



- It suggests that when price falls, more quantity is demanded & vice-versa at the aggregate level.
- As price falls, the quantity demanded increases to an extent that the product of the new price & ~~not~~ the new quantity remains the same as that of ~~the~~ $P \& Y$. i.e. $PY = MV$.
- Example:
If $M = \$100$ billion and $V=3$, then PY must be $\$300$ billion. If we set P , the price level, equal to 1, Y must be equal to $\$300$ billion ($300/1$). If P is 2, then Y is $\$150$ ($300/2$). If it is 0.5 then Y is ~~$\$600$~~ $\$600$ billion ($300/0.5$)

- If there is increase in M , then the aggregate demand curve will shift towards left.



- The AD curve shifts right if the MS increases and left if it decreases. Continuing the If we hold P constant at P_1 but double M to $2M$, then Y will double to $2Y_0$, cut M in half and Y will fall by half.

Reasons for a downward-sloping aggregate demand curve:

- * Wealth effect
- The aggregate demand curve is drawn under the ~~constant~~ assumption of the supply of money is constant.
- Supply of money is representing the economy's wealth at any moment in

time.

- As the price level rises, the wealth of the economy, as measured by the supply of money, declines because the purchasing power of money falls. As buyer becomes poorer, they reduce their purchases of all goods and services.
- On the other hand, as the price level falls, the purchasing power of money ~~and~~ is rises.
- Buyers become wealthier and are able to purchase more goods and services than before.
- The wealth effect, therefore, provides one reason for the inverse relationship between the price level and real GDP that is reflected in the downward-sloping demand curve.
- Money can also be said to be wealth as both are stock variables.
- If price is rising, real value of the money i.e. ~~M/P~~ M/P is decreasing i.e. purchasing power will decrease as the same money cannot be used to buy more product.

Interest rate effect

- As the price level rises, households and firms require more money to handle their transactions.
- However, the supply of money is fixed.
- The increased demand for a fixed supply of money causes the price of money, the interest rate to rise.
- As the interest rate rises, spending that is sensitive to rate of interest will decline.
- Hence, the interest rate effect provides another reason for the inverse relationship between the price level & the demand for real GDP.

Net exports effect

- As the domestic price level rises, foreign-made goods become relatively cheaper so that the demand for imports increases. However, the rise in the domestic price level also means that domestic-made goods are relatively more expensive to foreign buyers so that the demand

for exports decreases. When exports decrease and imports increase, net exports (exports - imports) decrease. Because net exports are a component of real GDP, the demand for real GDP declines as net exports decline.

- As price rises, real value of money i.e. M/P will decrease, so wealth of economy will decrease, i.e. the purchasing power of money falls as the price level rises. With the increased price level, less amount of good can be bought as the real money supply decreases.

$$\text{Real money supply} = M/P.$$

$$\text{Nominal money supply} = M.$$

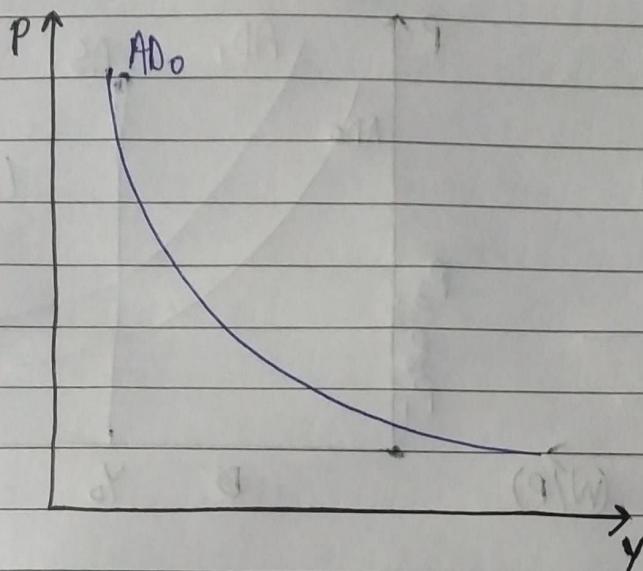
- The interest rate in an economy is determined by saving and investment.
- It can also be determined by demand & supply of loanable funds.
- According to classical economists, interest rate is determined by saving and investment. Saving & investment are a function of interest rate. If interest rate is high, saving is high & investment is low.

- Investment curve is negatively sloped and saving curve is positively sloped.
- Equilibrium interest rate is given by the intersection of saving & investment curve. a/c to classical economists.
- If interest rate \neq eq. interest rate, then there will be some discrepancy b/w saving & investment but in classical economics interest rate is flexible, so ultimately interest rate can be brought back to the equilibrium interest rate.
- But a/c to Keynes, interest rate is determined by money supply & money demand. Money supply is assumed to be fixed then money demand which is of three types: transaction, precautionary & speculative. ~~are determined~~ Transaction & precautionary demand for money are determined by income level of an economy whereas speculative demand for money is determined by rate of interest.
- Assuming, income of an economy is given, then higher is the rate of interest, higher is the speculative demand for money.
- By income of the economy, transaction

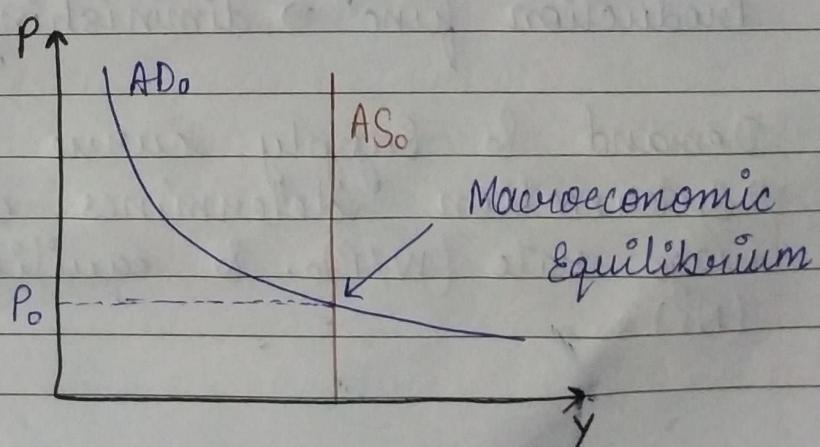
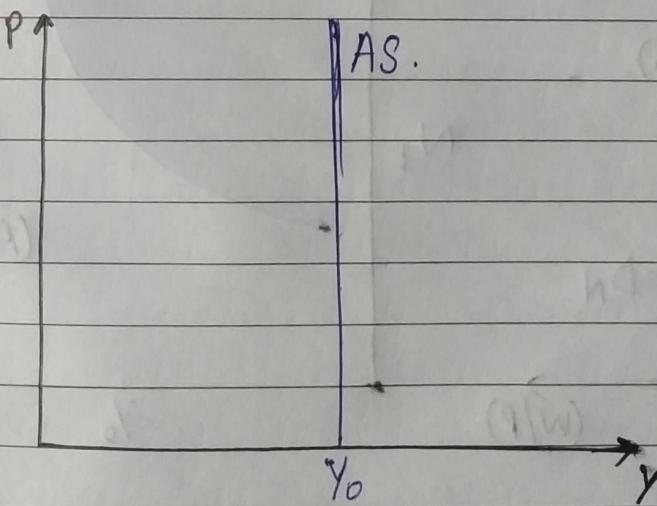
- ⑥ precautionary demands for money is calculated, speculative demand of money is calculated via interest rate, then total demand for money is calculated by the sum of the 3 demands.
- Then, the demand for money can be plotted across the different rates of interest & supply of money is constant i.e. it is a vertical straight line. The intersection of the 2 curves will give the equilibrium rate of interest.
 - When the demand for money increases, then price of money ~~rises~~ rises which implies that rate of interest rises.
 - As the interest rate will rise, demand for some goods will decrease.
 - As the interest rate will rise, people will prefer saving their money, therefore, spending on goods i.e. consumption of goods will decrease i.e. demand will decrease.
 - Interest rate can directly influence the demand for consumer durables. e.g. if loan is taken from a bank to buy a car & if interest rate is high, then

consumers will not prefer to take loans,
 \therefore demand for car will decrease.

Aggregate demand

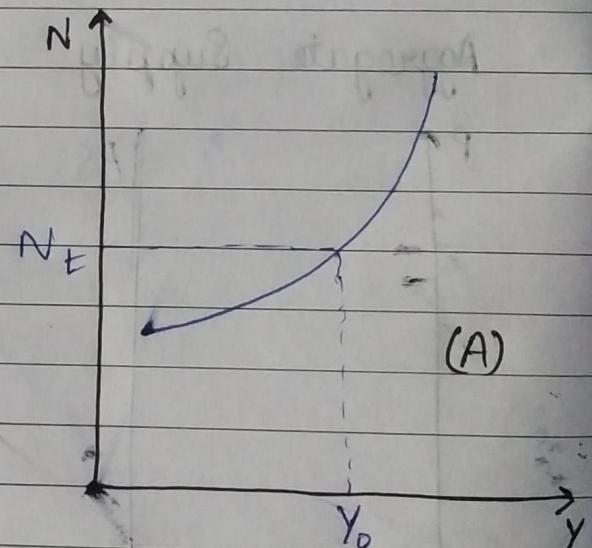
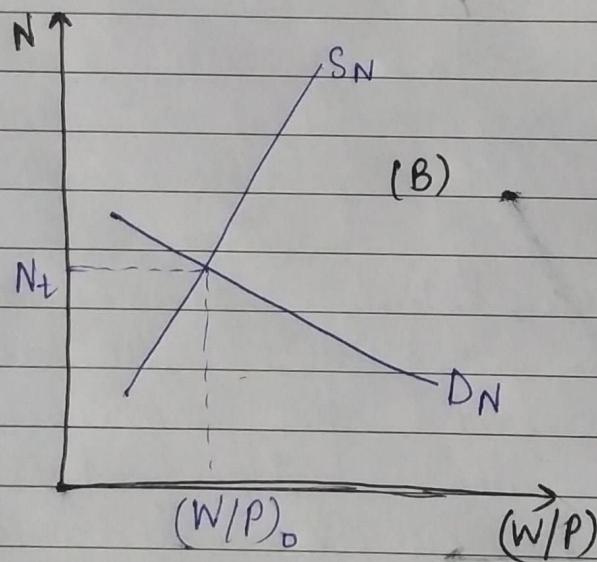
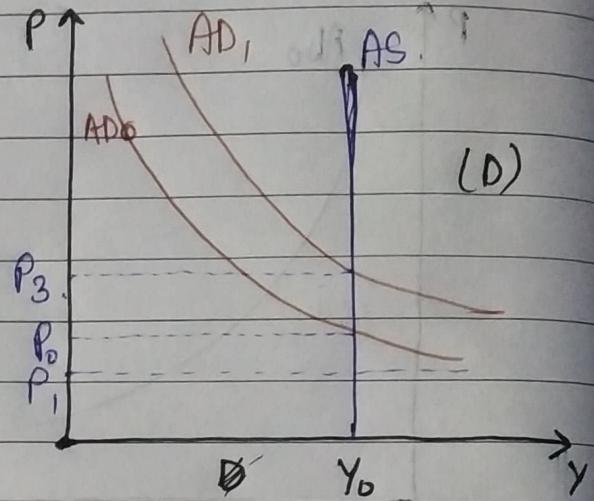
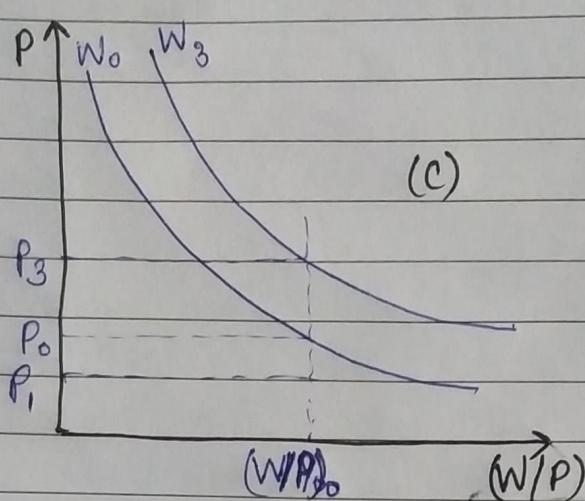


Aggregate Supply



Money supply also plays an important role in determining equilibrium.

Output & employment in Classical theory:



Production funcⁿ \Rightarrow diminishing MPP_L. (A)

Demand & Supply curve for labour (B)
 \Rightarrow intersection determines equilibrium wage rate $(W/P)_0$. & equilibrium employment (N_t) .

Corresponding to equilibrium eq. employment, there is eq. output (Y_0). i.e. full employment output.

Corresponding to the eq. output, there is an eq. price & an eq. wage rate. i.e. P_0 & $(W/P)_0$ & a corresponding eq. money wage w .

At money wage W_0 , price is P_0 :. at some $M_1 V = P_0 Y$, the M_1 , $M_1 V = P_0 Y$, aggregate demand curve will be AD_0 , if the ~~real~~ money wage changes to W_3 , eq. price changes to P_3 :. supply of money, M_1 changes to M_2 such that for $M_2 V = P_3 Y$, aggregate demand curve will be AD_1 . Or it can go the other way round i.e. if money supply changes then ultimately money wage will change such that real wage remains unchanged.

But if money supply decreases below M_1 , then we will get another money wage less than W_0 and it is possible as money wages are flexible up & down.