

MONETARY POLICY

Functions of the Apex Bank

Note issuing agency.

Banker's Bank

Only corporate banks are able to do transactions with the apex bank. RBI issues loans to other corporate banks.

Banker to the government

Controller of credit

Lender of last resort

When the government and other banks fail to meet their needs from other sources, they resort to the apex bank for borrowing.

Manages Exchange rate/currency

Manages Price stability

What is Monetary policy?

Monetary policy is the behaviour of the apex bank concerning the money supply.

Interest rates are the key area of monetary policy.

Basis of Monetary Policy is that there is a long run relationship between the amount of money and inflation.

Demand for Money - The amount people wish to hold as cash as opposed to other assets.

The Supply of Money - The amount of money in circulation in the economy.

The Classical Quantity Theory of Money:

$$MV = PY$$

M = the money stock

V = velocity of circulation

P = price level

Y = level of national income.

$$M_d = KPY$$

$P \rightarrow$ Price level

$Y \rightarrow$ Real national income

$M_d \rightarrow$ Demand for money for transaction purposes.

$K \rightarrow$ proportion of national income held as transaction balances.

$$\text{In eq: } M_d = M_s$$

$$P = \frac{1}{KY} \times M$$

A rise in M_s will lead to a proportional rise in P .

Supply of Money

Supply of money is a stock whose value can be measured on a particular date.

Narrow money - Notes and coins in circulation (M_0)

Broad Money - Notes and coins plus money held in bank and building society accounts (M_1).

Notes above Rs 2 denomination are printed and held by the RBI. It is often called RBI money whereas coins of Rs 1 and other denominations are directly held by GOI & is often called government money.

Four measures of Money Supply

$$M_1 = CU + D \text{ (Narrow money)}$$

$CU \rightarrow$ Currency

$D \rightarrow$ Deposit (Demand deposits)

→ Redeemable on demand. (Bank deposits)

$$M_2 = M_1 + \text{Saving p. deposits with post office savings banks.}$$

$M_3 = M_1 + \text{Net time deposits of banks (interbank deposits are netted out) (Broad Money)}$

If bank X deposits in bank Y then it is not considered. The deposits made by the

public in the banks for a time period like 4 or 5 years & known as fixed deposits, these all are considered net time deposits.

$M_4 = M_3 + \text{total deposits with the post office savings organizations.}$

Total deposits with the post office are insignificant in India, \therefore practically $M_4 = M_3$.

for a commercial bank.

Deposits are liabilities: Because deposits are to be repaid to the people to whom they belong.

Loans, bonds and cash reserves are assets: Cash reserves for the banks include cash in hand + cash with RBI.

CRR is an important instrument of monetary control.

for the RBI.

Assets:

Foreign assets

Gold - It can be traded internationally & can be turned to money.

Domestic assets (loan to GOI and banks): Because they can be recovered later with interest.

Liabilities

Currency in circulation: RBI as the custodian of the currency is accountable for it.

Deposits of banks: } Have to be repaid to
Deposits of GOI. } the owner.

Money creation Process

Liabilities of RBI

Monetary Base / Base Money / Reserve Money / High powered Money

$$B = CU + R$$

B → Monetary base.

CU: Currency in circulation

R: Reserve by the banks at RBI.

Increase in base money by Re 1 → ~~increase~~
increases money supply by more than Re 1
(~~Money Supply~~) (Money Multiplier)

Money multiplier is the extent to which money supply could be increased by increase in base money.

Asset side Definition

As RBI's assets and liabilities must be equal by balance sheet identity, it implies

$$B = FA + DC$$

FA: stock of foreign assets (+gold) by RBI

DC: Domestic credit (loans to GOI and commercial banks)

$$B = CV + R = FA + DC$$

Initially, for simplicity, we assume:

1. Public hold no currency ($CV=0$), use cheque for payments.
2. No dearth for demand for bank loans.
3. Assets of banks consist of only commercial banks.

Let the CRR be k .

CRR \rightarrow Cash Reserve Ratio.

$k \rightarrow$ Fraction of total deposits to be kept with ~~RBI~~ as reserve with RBI.

CRR is ~~a~~ monetary instrument in the hands of RBI in India.

$$B = R \quad (CV=0)$$

$$MS = D \quad (CV=0)$$

as currency is zero, \therefore money supply is the total ~~deposits~~ demand deposit in the banks.
 $R = kD$.

R = Reserve by the banks at RBI.

$$MS = \left(\frac{1}{k}\right) B$$

Money supply = Money Multiplier $\left(\frac{1}{k}\right)$ \times Monetary Base.

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$\frac{1}{k} > 1$, because it is the inverse of fractional CRR.

Money creation in perpetuity

	New loans	New deposits & investments	Balance	CRR
Original Bank	\$100 M	\$80 M	\$20 M	
2 nd gen. Bank	80	64	16	
3 rd gen. Bank	64	51.2	12.8	
4 th gen. Bank	51.2	41.0	10.2	
5 th gen. Bank	40.9	32.8	8.2	
6 th gen. Bank	32.8	26.2	6.5	
7 th gen. Bank	26.2	21.0	5.2	
8 th gen. Bank	21.0	16.8	4.2	
9 th gen. Bank	16.8	13.4	3.4	
10 th gen. Bank	13.4	10.7	2.7	
Sum of first 10 banks	\$446 M	\$357 M	\$89 M	
Sum of remaining banks	\$54 M	\$43 M	\$11 M	
Total	\$500 M	\$400 M	\$100 M	

Monetary base = \$100 million (reserves)

Total quantity of money = \$500 million

The loans & investments passed by one bank cannot be kept as tax, they are again deposited in another bank.

∴ The loans & investments of \$80M of the original bank will be the new deposit for the 2nd generation bank, 20% of which will

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to be kept as cash reserve balance & remaining will be given out as new loans & investments which in turn will become the new deposit of 3rd generation bank & so on.

∴ after 10 levels, total deposits are \$ 446 M, out of which \$ 357 M are new loans & investment & \$ 89 M has been kept as cash reserve balance.

∴ With the initial monetary base \$ 100 million (reserves), the total quantity of money becomes \$ 500 million.

∴ Money multiplier = 5.

Assuming $k = 10\%$, if government purchases goods worth of Rs 100 from A and pays him drawing a cheque on its account at the RBI.

$$\text{Total rise in } D = 100 + 90 + 81 + \dots$$

$$= 100(1 + 0.9 + (0.9)^2 + (0.9)^3 + \dots)$$

$$= 100 \left(\frac{1}{1-0.9} \right) = 1000$$

~~Critical assumption:~~ Banks can always find borrowers.

Relaxing the assumption of "No currency with the Public"

If we assume that desired currency holding is proportional to demand deposits.

$$CU = cD \quad 0 < c < 1$$

$$B = CU + R = cD + R = (c+k)D.$$

$$D = \left(\frac{1}{c+k} \right) B$$

$$M_S = CU + D = (1+c)D = \left(\frac{1+c}{c+k} \right) B$$

Money multiplier $\frac{1+c}{c+k} < \frac{1}{k}$

$c \rightarrow$ leakage.

Given monetary base, higher the money multiplier, higher is the money supply.

A smaller c implies less leakage.

Multiplier can be raised, if payments habit changes (from cash to cheque, credit cards, ATM).

M_S will rise if

k (CRR) decreases ($1/k$ will rise)

c (Public's desired currency-deposit ratio) falls
 B increases.

Example:

In our ~~ex~~ economy, monetary liabilities of RBI is Rs 10000 and govt money is Rs 2000. The currency-deposit ratio is 0.33. RBI's money supply target is Rs 45000.

Find the reserve ratio, the RBI must impose on banks to achieve the money supply

target.

High powered Money = Monetary liabilities of
 RBI + govt. money = $10000 + 2000 = 12000$
 Currency - deposit Ratio = 0.33
 Money supply : Rs 45000

$$45000 = 12000 \left(\frac{1.33}{0.33+k} \right)$$

$$45000(0.33+k) = 12000 \times 1.33$$

$$45000k = 15,960 - 14850$$

$$k = \frac{1110}{45000} = 0.025$$

The Demand for Money.

The main concern in the study of the demand for money is :

How much of financial assets one wants to hold in the form of money, which does not earn interest, versus how much one wants to hold in interest-bearing securities, such as bonds.

There is a trade-off between the liquidity of money and the interest income offered by other kinds of assets.

The transaction motive is the main reason that people hold money - to buy things.

The transaction motive.

There are only two kinds of assets available to households: bonds and money.

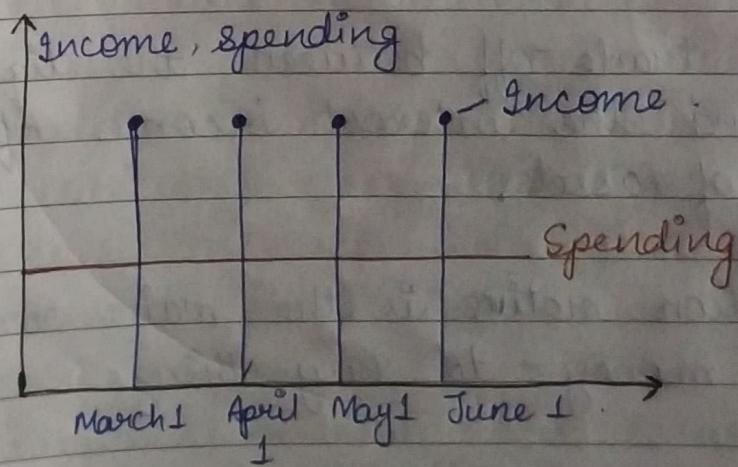
The typical household's income arrives once a month, at the beginning of the month.

Spending occurs at a completely uniform rate - the same amount is spent each day.

Spending is exactly equal to income for the month.

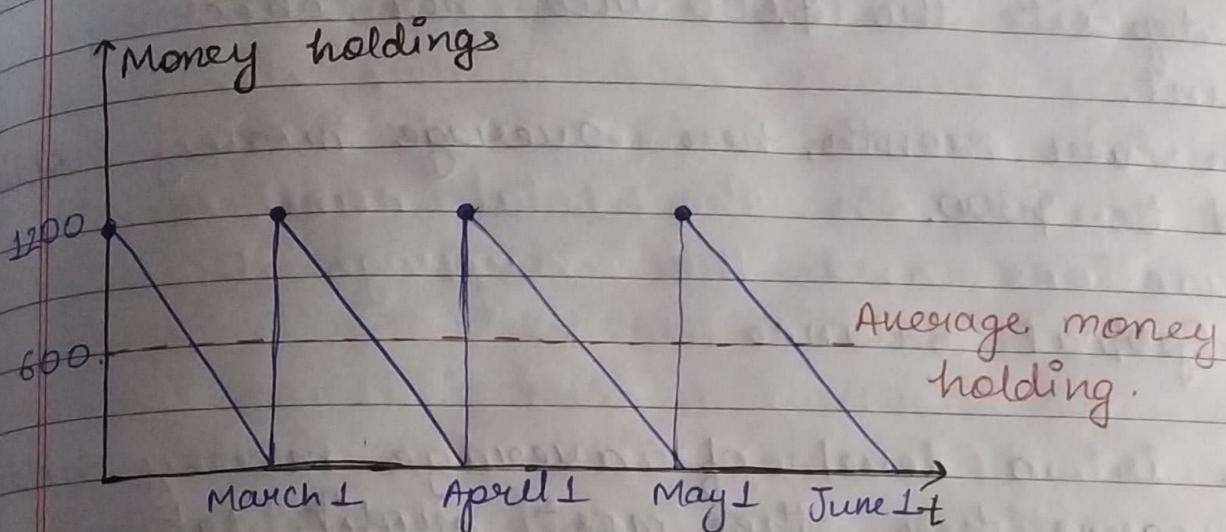
The Non-synchronization of Income and spending.

The mismatch between the timing of money inflow to the household and the timing of money outflow for household expenses is called the non-synchronization of income and spending.



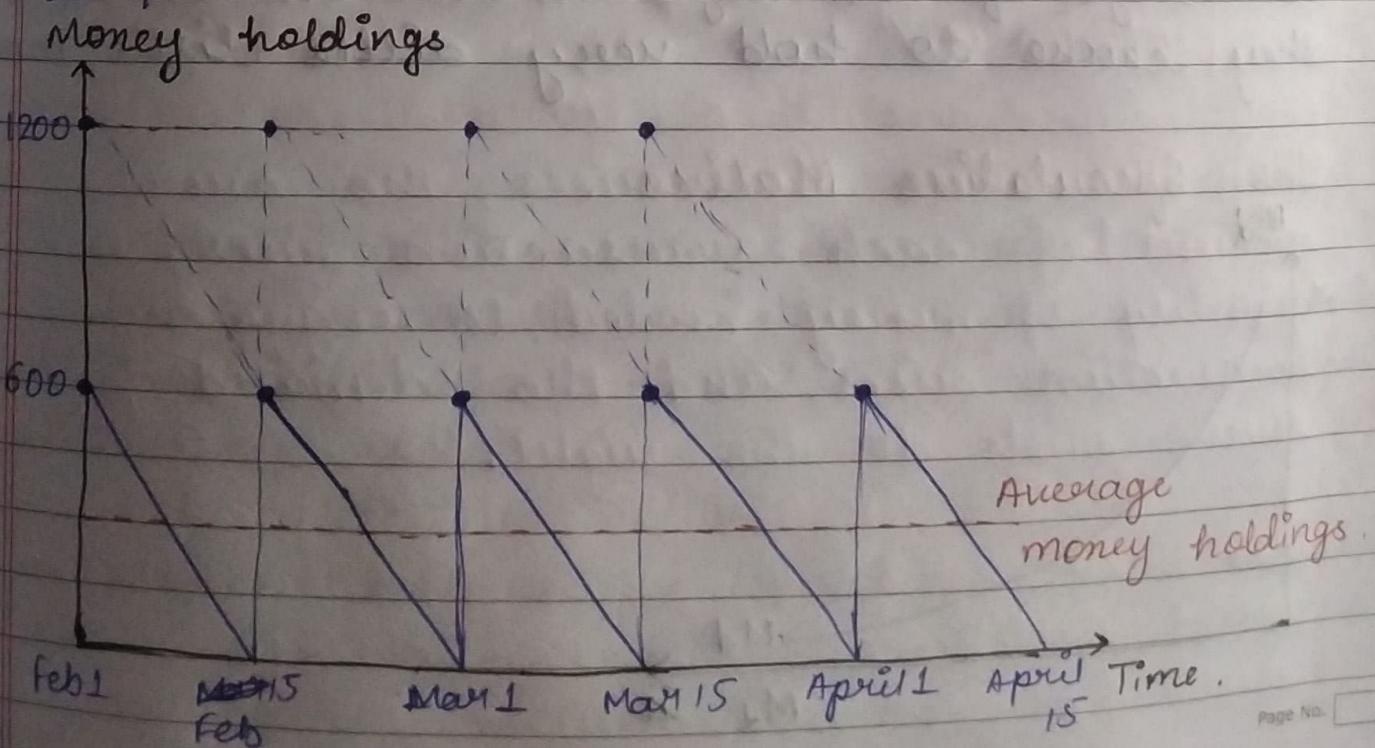
Income arrives only once a month, but spending takes place continuously.

Money Management



A person could decide to deposit her entire paycheck (\$1200) into her checking account at the start of the month and run her balance down to zero by the end of the month.

In this case, her average money holdings would be \$600.



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She could decide to deposit half of her paycheck (\$1200) into her checking account, and buy a \$600 bond with the other half. At mid-month, she could sell the bond and deposit the \$600 into her checking account.

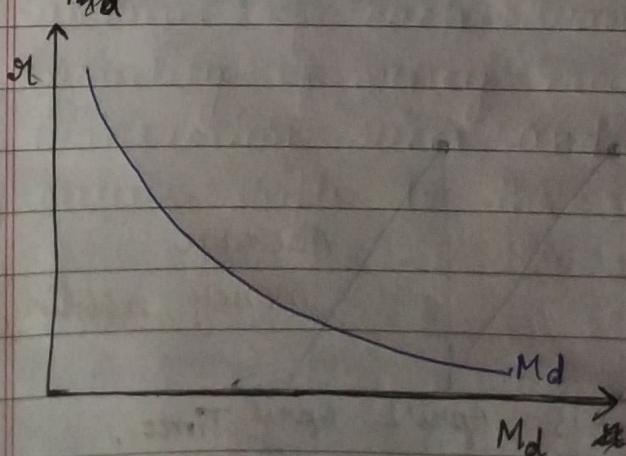
Month over month, her average money holding would be \$300.

The Optimal Balance

There is a level of average money holdings that earns her the most profit, taking into account both the interest earned on bonds and the cost paid for switching from bonds to money. This level is his optimal balance.

An increase in the interest rate lowers the optimal money balance. People want to take advantage of the high return on bonds, so they choose to hold very ~~little~~ little money.

The Speculative Motive



The speculative motive: Because the market value of interest-bearing bonds is inversely related to the interest rate, investors may ~~hold~~ wish to hold bonds when interest rates are high with the hope of selling them when interest rate falls.

If someone buys a 10-year bond with a fixed rate of 10%, and a newly issued 10-year bond pays 12%, then the old bond paying 10% will have fallen in value.

Higher bond prices mean that the interest a buyer is willing to accept is lower than before.

When interest rates are high (low) and expected to fall (rise), demand for bonds is likely to be high (low) thus money demand is likely to be low (~~high~~ high).

The total Demand for Money.

The quantity of money demanded at any moment depends on the opportunity cost of holding money, a cost determined by the interest rate.

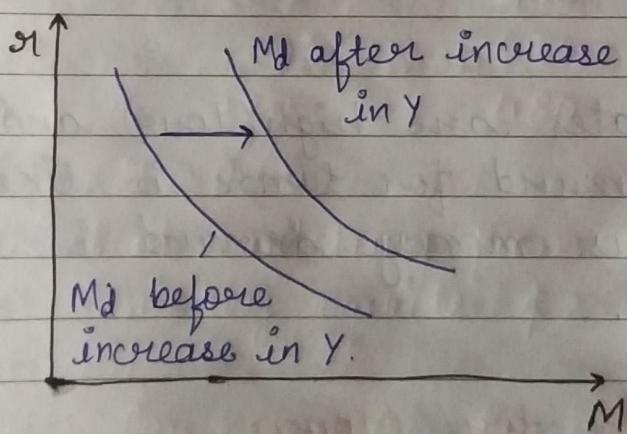
A higher interest rate raises the opportunity cost of holding money and thus reduces the quantity of money demand.

Transactions Volume and the Price level

The total demand for money in the economy depends on the total dollar volume of transactions made.

The total dollar volume of transactions, in turn, depends on the total number of transactions, and the average transaction amount.

When output (income) rises, the total number of transactions rises, and the demand for money curve shifts to the right.



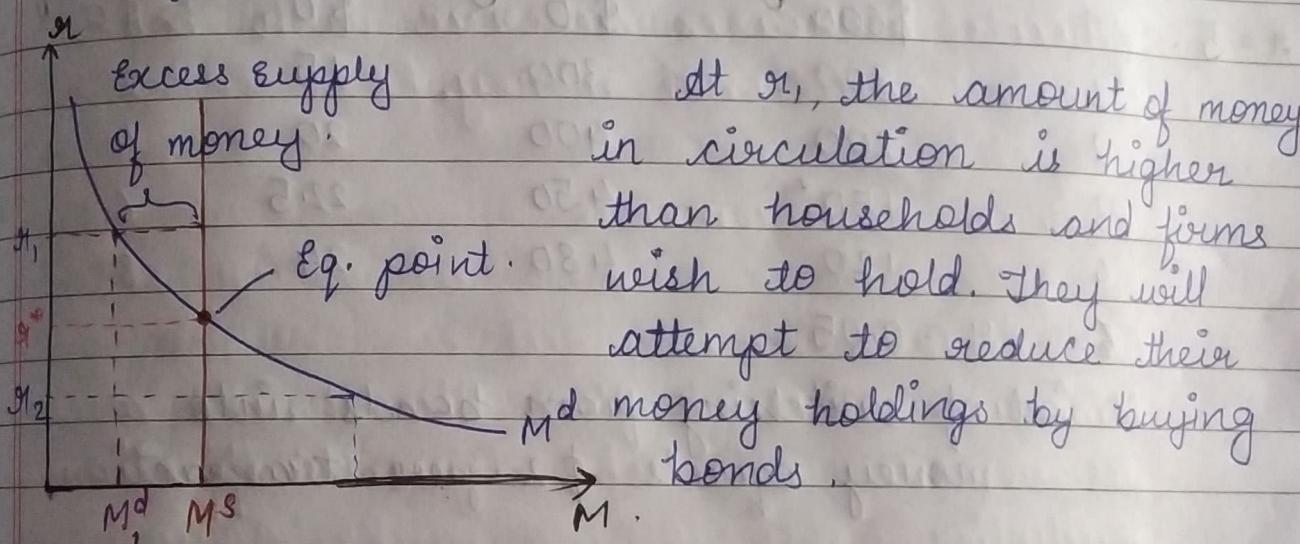
When the price level rises, the average dollar amount of each transaction rises; thus, the quantity of money needed to engage in transaction rises, and the demand for money curve shifts to the right.



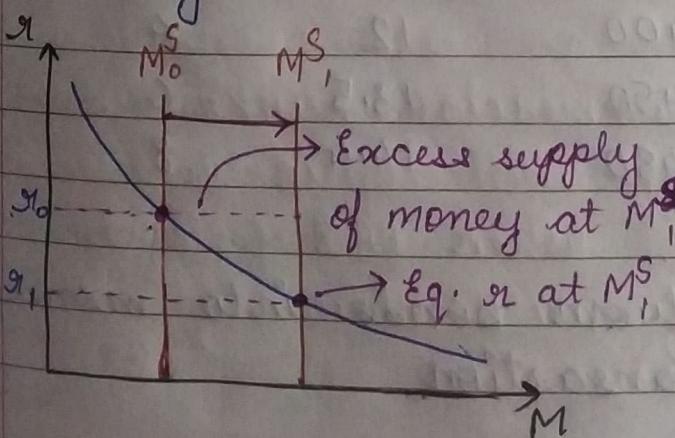
The determinants of Money demand.

1. The interest rate: r (negative effect).
2. The dollar volume of transactions (positive effect).
3. Aggregate output (income): Y (positive effect).
4. The price level: P (positive effect).

Money demand answers the question: How much money do firms and households desire to hold at a specific point in time, given the current interest rate, volume of economic activity and price level.



At r_2 , households don't have enough money to facilitate ordinary transactions. They will shift assets out of bonds and into their checking accounts.



An increase in the supply of money lowers the rate of interest.

Rate of interest determines money demand and rate of interest itself is determined by money supply and money demand. ∴ Money supply & rate of interest are 2 major tools in the hand of RBI and monetary authorities of the country.

$\pi = 5\%$	No. of switches(a)	Avg. money holding(b)	Avg. Bond holding(c)	Interest earned(d)	Interest cost of switching(e)	Net Profit
	0	\$600	\$0	\$0	\$0	\$0
	1	300	300	15	2	13
	2	200	400	20	4	16
	3	150*	450	22.5	6	16.5
	4	120	480	24	8	16
	$\pi = 0.05$					

Cost of switching from bonds into money equals \$2 per transaction.

$\pi = 3\%$	No. of switches	Avg. money holding	Avg. Bond holding	Interest earned	Interest cost of switching	Net Profit
	0	\$600	\$0	\$0	\$0	\$0
	1	300	300	9	2	7
	2	200*	400	12	4	8
	3	150	450	13.5	6	7.5
	4	120	480	14.4	8	6.4
	$\pi = 0.03$					

Cost of switching from bonds into money equals \$2 per transaction

Number of switches \Rightarrow The number of times you sell a bond.

$$\text{Average money holdings} = \frac{600}{a+1}$$

$$\text{Average bond holdings} = 600 - b$$

$$\text{Interest earned} = r_1 \times \text{Average bond holdings}$$

$$\text{Cost of switching} = t \times \text{No. of switches}$$

$t \rightarrow$ cost per switch (\$2).

$$\text{Net profit} = \text{Interest earned} - \text{Cost of switching}$$

for $r_1 = 0.05$, optimum money holding is \$150

& for $r_1 = 0.03$, optimum money holding is \$200.

For higher r_1 , optimum money holding is lower.

Optimum money holding corresponds to the highest net profit.

Tools of Monetary Control

Open Market Operation

Reserve Requirements

Bank Rate / Discount rate

Liquidity adjustment facility

* Open Market Operation

Buying and selling of govt bonds.

If RBI buys bonds, it increases money supply

When inflation in the economy is high, the RBI sells bonds in order to decrease money supply.

A part of the increased money supply can be kept as currency, another part as deposits.

Each new money held as currency increases money supply exactly by the ~~not~~ equal amount.

Deposits increase reserve with banks and create additional money.

Reserve requirements

Cash Reserve Ratio

Minimum amount that the banks must hold as reserve against deposits: affects money multiplier.

When the RBI wants to increase the money supply in the economy, it decreases the CRR and vice-versa.

Liquidity of the commercial banks reduces as CRR rises, they will have lesser money to lend to public. When RBI feels that the commercial banks should have more liquidity it reduces the CRR.

During inflation, CRR is increased & vice-versa.

~~Statutory~~ Statutory Liquid Ratio

Minimum amount of liquid assets ~~that~~ the banks must have in the form of cash, gold and un-encumbered approved securities. Banks have to hold a minimum ~~liquid~~ amount of cash, gold or bonds, it is the SLR.

Currently in India:

CRR: 3.5%

SLR: 18%

CRR does not include interest rate whereas banks get interest on the deposits made ~~as~~ as SLR.

Bank Rate / Discount Rate

The rate at which the RBI refinances other banks.

It is the rate at ~~which~~ RBI takes the loan back from the corporate banks. It is an ~~is~~ indirect measure to control the money supply.

Two roles:

- i) Effects on banks' borrowing and their reserves. When inflation is high, RBI could increase

the bank rate so that corporate banks are discouraged to borrow from RBI.

By increasing the bank rate, RBI tries to contain inflation.

- Effect on interest rate leading to effect on reserve-deposit ratio and currency-deposit ratio (relationship is inverse).

Bank rate: 4.25%

Liquidity adjustment facility

Repo rate: Rate at which RBI lends to banks (injection)

Repo: Repurchase agreement
Reverse repo rate: Rate at which RBI borrows from banks (sucking out).

It is called as repurchase agreement as the RBI lends to the banks against the govt. securities kept as collateral with the RBI. with the repurchasing agreement that at a later date, the bank will buy back the securities from the RBI.

Repo rate corresponds to injection as the RBI is increasing the liquidity available with the banks. It is a short-term loan. Transaction could be between 1-14 days.

It brings stability in short-term interest rates.

Call Money rate:

Rate at which short term funds are borrowed and lent in the money market.

Duration of the call money is one day.

Rate at which inter-banking transactions take place overnight.

Sometimes, these transactions can be b/w two branches of a bank.

Loans to fill the asset-liability mismatch.

Comply with the statutory CRR and SLR requirements:

If the RBI checks if the banks are following CRR and SLR or not & the banks ~~are~~ are lacking funds then they borrow money at the call money rate.

To meet the sudden demand of funds.

Currently in India:

repo rate = 4%

reverse repo rate = 3.35%.

Both monetary and fiscal policy have effect on price level and real GDP.

But, fiscal policy have more effect on increasing output and monetary policy is more effective for containing inflation rate.

Cause-Effect chain: Interest rate effect on AD

Money supply affects interest rates.
Interest rate affect investment. Investment
is a component of AD. Eg: GDP ~~is~~ is changed

The wealth effect on AD.

A lower price raises the real value of
household's money holding: wealth.

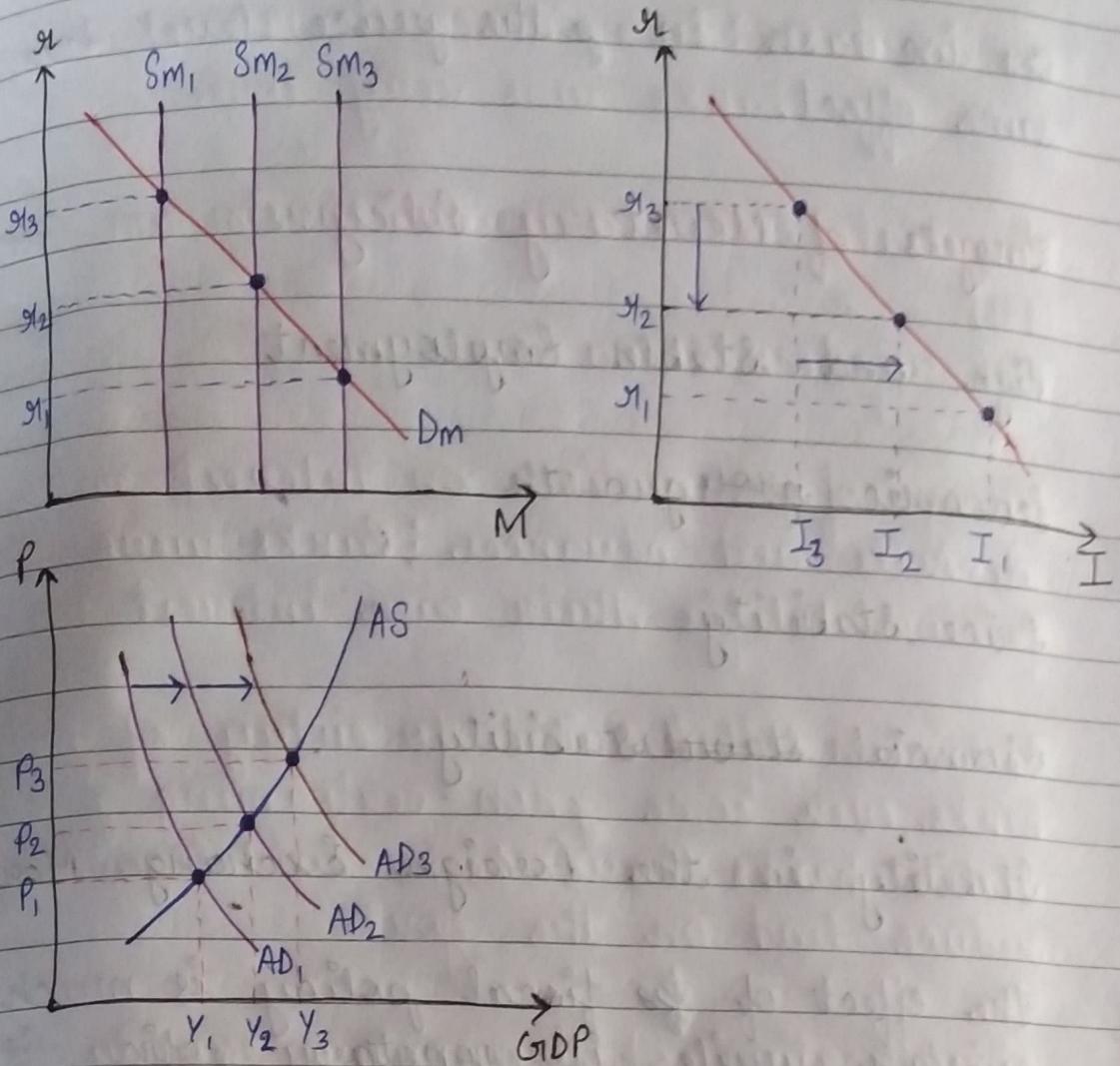
Higher real wealth leads to higher ~~is~~
consumption spending.

Thus AD increases.

The Exchange rate effect on AD.

A lower price reduces ~~is~~.
Investors (bond seekers) move some of their
~~is~~ funds overseas to earn higher returns.
This movement of fund causes real value
of domestic currency to fall against
foreign currency.

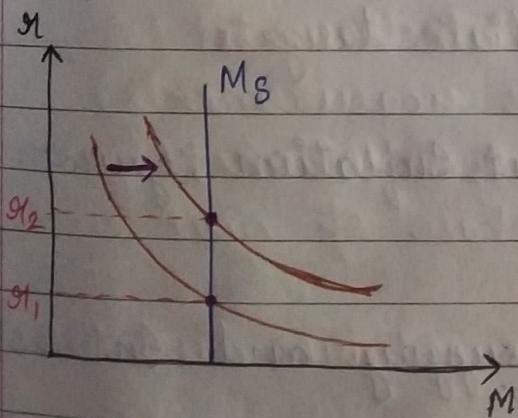
Domestic goods become less expensive relative
to foreign goods. This stimulates ~~is~~ exports
leading to ~~foreign~~ increase in AD.



If the Money Supply Increases to stimulate the Economy:

Interest rate decreases, investment increases, AD & GDP increases with slight inflation

Increasing money supply continues the growth-but, increases the Price level.



An increase in aggregate output (income) shifts the money demand curve, which raises the eq. interest rate.

An increase in the price level has the same effect.

Targets of Monetary Policy

High and stable employment

Economic ~~not~~ growth

Price stability

Financial ~~stab~~ stability

Stability in the Foreign Exchange Market

The effect of ~~fis~~ fiscal policy is much quicker, while if monetary policy is implemented the effect on output is realized after an year's time or maybe more. It is said that fiscal policy is more relevant for influencing the output whereas monetary policy is more relevant for influencing the price level.

Ultimate Vs Intermediate targets

Ultimate: Unemployment, Inflation, Growth of Real GDP.

Intermediate: Money supply and Interest rate stability.

Financial Sector Reforms in India.

Pre-reforms Scenario.

Regulated interest rates

Regulated financial investments

Restrictions of banks

Lack of competition

Nationalized banks to perform social duties at the cost of profitability.

Cumulative rise in inefficiencies and NPAs (Non-performing assets).

RBI lacked autonomy.

Govt. gave subsidies to large people & made the commercial nationalized banks to give out social loans, large part of which was not recovered & the banks suffered huge losses.

GOI borrowed from RBI without limit through ad hoc treasury bill (basically overdraft). It meant for the RBI to print large amount of new money, which led to high inflation rate.

BLR was very high (with low interest rates).

Households sector did not like to invest in these bonds, especially govt. bonds, only banks invested in govt. securities.

CRR and SLR: 60% in early 1990s. Liquidity with the banks was very low.

Financial Sector Reforms (Narsimham Committee, 1991)

Post-reforms scenario:

Lifting of regulations on interest rates on deposits and advances. Banks were given freedom to fix their own interest rate.

Reduction of barrier to entry of private banks, even some non-performing public sector banks have been privatized, to reduce load on the govt.

Liberalization of branching regulations for both ~~not~~ private & public sector banks. It is helping in greater financial inclusion.

Reduction of the ~~appropriation~~ of loanable funds by the GOI through gradual decrease in CRR and SLR.

Move from a direct instrument (Administered interest rates, reserve requirements) to indirect instruments (Open Market Operations, purchase and repurchase of govt securities)

GOI has no power to control interest rates.

Automatic monetization of deficit is under scanner: Govt. cannot directly borrow from the RBI to finance any deficits, those borrowings are scanned.

Monetized deficit (short and long term borrowing from RBI) as a % of GDP has fallen from 2% in 1980-91 to 0.5% in 1992-2004.

Current Issues in the Banking System

Large NPA: Govt. has been trying to merge commercial banks & PSUs and even privatizing some PSUs.

Obligatory advances to priority sector: lending to the priority sectors at concessional rates creates issues of ~~sust~~ sustainability and profitability for the banks.

Competition from the NBFC (Non-Banking financial companies) and foreign players for the nationalized commercial banks.: It will help the commercial banks to become more competitive and efficient in the long run.

Capital adequacy ratio to be optimized.
Rural market for banking
Issues of financial inclusion
Digitization.