Financial Market

Types of Money

- Fiat Money- It derives it value solely because of a government decree. it is the money that is legally required to be accepted as payments for all debts. Hence it is also Legal Tender Money.

Money supply

- Money supply(M^{ss}): Quantity of money in the economy/ sum of currency in circulation with public/total amount of currency held by public

- Money is the stock of assets used for transaction. If only one single asset is used for transactions, then it is easier to measure the stock of money by accessing the stock of that asset. For eg: Gold

- But , people use various assets to perform transactions-eg: cash –in-hand, cash-in-bank/deposits.

- Thus, various assets can be used for transaction, and qualifies to be considered as money. Hence there are different measures of money supply which account for different financial assets that serves the purpose of money

Quantity of Money/Money Supply-components

- **Currency**: The sum of outstanding paper money and coins

- **Demand deposits**: the funds people hold in their bank accounts (Current Accounts).
  - If most sellers accept personal debit cards/UPI /cheque payments that access bank accounts balances, then assets in these accounts are almost as convenient as currency. That is, the assets are in a form that can easily facilitate a transaction. Demand deposits are therefore added to currency when measuring the quantity of money.

Money supply

Mo	Currency in circulation
M1	Currency in circulation + Demand Deposits (with commercial bank) + Other Deposits at the RBI C+D+OD
M2	M1+Post Office savings account
M3	M1+Time deposits with Bank
M4	M3+All deposits with post office

M1

- Currency in circulation (C)
  - Currency notes and coins that are held by the public and is used for transaction. It is the most liquid form of money
- Demand deposits (D) with commercial banks
  - The cheques drawn / digital payments/ debit card payments are based on bank account demand deposits. Hence, they are considered to be currency as they are widely accepted as payment method.
  - Inter bank deposit is not a part of M1 as they are not held by the general public
- Other Deposits (OD) held by RBI
  - Include deposits held by RBI on behalf of foreign banks, foreign governments, IMF, World Bank, public financial institutions etc.
  - It does not include deposits of banks or GoI with the RBI
  - However, OD is a small fraction of M1 and hence do not have major impact on the formation of India's monetary policy

M2

- M2= M1+ Post office Saving Bank Deposits (SB a/c)

- SB deposit a/c at post office:
  - The accounts cannot be withdrawn via cheque
- M2 measure is a broader measure of money supply than M1. However it is less liquid than M1
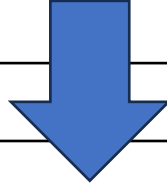
M3

- M3=M1+ Banks net time deposits

- Banks net time deposit : Includes fixed deposits

- Less liquid than M1 and M2

- More broad than other two measures

M4

- M4=M3+ total post office bank deposits

Money supply

M1	Currency in circulation + Demand Deposits (with commercial bank) + Other Deposits at the RBI C+D+OD	Narrow measure of money supply
M2	M1+Post Office savings account	
M3	M1+Time deposits with Bank	
M4	M3+All deposits with post office	Boarder measure of money supply

M1 >M2 > M3>M4 in terms of liquidity

Role of Banks in the monetary system

- The money supply includes both currency in the hands of the public and deposits at banks that households can use on demand for transactions.

- Money Supply= Currency + Demand Deposits

    M   = C   +   D

- Since demand deposit(D) is a component of money supply(M); Banking system affects money supply

- Banks are regulated by central banks + currency is issued by central bank; hence central banks together with banks influence the money supply in the economy

Reserve Banking System

- The deposits that banks have received but have not lent out are called *reserves*.

- Some percent of reserves are held in the vaults of local banks across the country, and the rest are held at the central bank

- RBI- reserve ratio?

100-percent Reserve Banking

- If no banking system- then all money takes the form of currency.

  $M=C$

- Banks are introduced to the system- they only accept deposits (to keep money safe); but do not give loans.

- In such case, all deposits are held as reserves. Banks simply accept deposits, place the money in reserve, and leave the money there until the depositor makes a withdrawal or writes a check against the balance. This system is called *100-percent-reserve banking.*

- Suppose that there is Rs.1000 of currency in the economy. i.e. M=C=Rs.1000.
- Assume that households deposit the economy's entire Rs.1000 in Bank-1.

Bank 1-Balance Sheet

Asset (Rs.)		Liabilities(Rs.)	
Reserves	1000	Deposits	1000

- The bank's assets are the Rs.1,000 it holds as reserves; the bank's liabilities are the Rs.1,000 it owes to depositors.
- Since this bank is not making loans, so it will not earn profit from its assets.
- We can assume the bank presumably charges depositors a small fee to cover its costs.

- What is the money supply in this economy?
- $M = C + D$
- So is $M = 1000 + 1000 = 2000$?

- What is the money supply in this economy?
- Before the creation of Bank-1, the money supply was the Rs.1,000 of currency. (M=C=1000)
- After the creation of Bank-1, the money supply is the Rs.1,000 of demand deposits.
- M=D=1000 (as C=0 after the demand deposit)
- A dollar deposited in a bank reduces currency by one dollar and raises deposits by one dollar, so *the money supply remains the same. If banks hold 100 percent of deposits in reserve,* the banking system does not affect the supply of money.

Fractional-Reserve Banking

- Banks-accept deposits and also give loans

- Loans are asset for banks as they can get profit out of it by charging interest on loans.

- However banks must keep some reserves on hand so that funds are available whenever depositors want to make withdrawals.

- But as long as the amount of new deposits approximately equals the amount of withdrawals, a bank need not keep all its deposits in reserve. Thus, bankers have an incentive to lend.

- When bank lend money as loan, then if follows *fractional-reserve banking*, a system under which banks keep only a fraction of their deposits in reserve

- Bank 1 : accept Rs.1000 deposit.
- The *reserve-deposit ratio* (fraction of deposit kept as reserve)= 20%
- Hence bank keeps Rs 200 as reserve and lends out Rs.800.

Bank-1 Balance Sheet			
Assets (Rs.)		Liabilities (Rs.)	
Reserves	200	Deposits	1000
Loans	800		

- What is money supply in the fractional reserve banking system
- Is it still M=D=1000?

- What is money supply in the fractional reserve banking system
- Is it still M=D=1000?
- D=1000
- The depositor still has a demand deposit of Rs.1,000, but now the borrower holds Rs. 800 in currency.
- M=C+D=800+1000=Rs.1800
- Thus, *in a system of fractional-reserve banking, banks create money*

- If the borrower use this Rs.800 to pay some debt and the receiver deposited this money in another bank (Bank-2), then the process of money creation continues

Bank-2 Balance Sheet			
Assets (Rs.)		Liabilities (Rs.)	
Reserves	160	Deposits	800
Loans	640		

- Bank-2 receives the Rs. 800 in deposits, keeps 20 percent, or Rs.160, in reserve and then lends Rs.640. Thus, Bank-2 creates Rs. 640 of money.

- If Rs.640 is deposited in another bank (the borrower of Bank-2 started a business and paid his supplier this 640; and the supplier deposited in Bank-3)

Bank-3 Balance Sheet			
Assets (Rs.)		Liabilities (Rs.)	
Reserves	128	Deposits	640
Loans	512		

- The process goes on; hence with each deposit and loan more money is created

- Money creation depends on reserve-deposit ratio (*rr*).
- *rr*=20%
- Original deposit=Rs.1000
- Bank-1 lending=800= (1-rr)*1000
- Bank-2 lending=640=(1-rr)*800

    =(1-rr)[(1-rr)*1000]=$(1-rr)^{2}$* 1000
- Bank-3 lending=512=(1-rr)*640

    =(1-rr) [$(1-rr)^{2}$* 1000]=)=$(1-rr)^{3}$* 1000

Increase in money supply through fractional reserve system

- Money supply=1000+800+640+ 540+…

    =1000+(1-rr)1000 + $(1-rr)^2$ * 1000 + + $(1-rr)^3$ * 1000

    =1000[1+ (1-rr) + $(1-rr)^2$ + $(1-rr)^3$ + ….]

    =1000 [1/1-(1-rr)]=1000 (1/rr)

    =1000(1/0.2)= Rs. 5000

Relevance of Banks as financial intermediary

- The banking system's *ability to create money* is the main difference between banks and other financial institutions.

- Financial markets have the important function of transferring the economy's resources from those households that wish to save some of their income for the future to those households and firms that wish to borrow to buy investment goods to be used in future production. This process of transferring funds from savers to borrowers is called financial intermediation.

- Many institutions act as financial intermediaries: the most prominent examples are the stock market, the bond market, and the banking system. Yet, of these financial institutions, only banks have the legal authority to create assets (such as demand deposit accounts-CA/SB) that are part of the money supply. Therefore, banks are the only financial institutions that directly influence the money supply.

- Although the system of fractional-reserve banking *creates money,* it *does not create wealth*.
- When a bank lends some of its reserves, it gives borrowers the ability to make transactions and therefore increases the money supply.
- The borrowers are also undertaking debt obligations to the bank, so the loans do not make them wealthier.
- In other words, the creation of money by the banking system increases the economy's liquidity (by increasing money supply), not its wealth.

Banks-capital, leverage and capital requirement and insolvency

- Earlier simplified model: bank liabilities=deposits;

  assets=reserves &loans

- In real scenario: Opening a bank requires some capital. That is, the bank owners must start with some financial resources to get the business going. Those resources are called bank *capital* or, equivalently, the *equity* of the bank's owners

- The bank obtains resources from:
  - its owners who provide capital,
  - from customers by taking in deposits,
  - and from investors by issuing debt/ debentures/bonds.
- It uses these resources in three ways.
  - Some funds are held as reserves;
  - some are used to make bank loans;
  - and some are used to buy financial securities, such as government or corporate bonds.

Bank Balance Sheet			
Assets (Rs.)		Liabilities (Rs.)	
Reserves	200	Deposits	750
Loans	500	Debt	200
Securities	300	Capital/Equity	50

- The reserves, loans, and securities on the left side of the balance sheet must equal, in total, the deposits, debt, and capital on the right side of the balance sheet

- The bank allocates its resources among these asset classes, considering the risk and return that each offers and any regulations that restrict its choices.

- The *leverage ratio* is the ratio of the bank's total assets to the bank's capital (represents the owners' equity)
- This business strategy relies on *leverage,* which is the use of borrowed money to supplement existing funds for purposes of investment.

- If the bank's assets fall in value by just 5 percent, then the Rs.1,000 of assets is now worth only Rs.950.

- Since the depositors and debt holders have the legal right to be paid first, the owners' equity falls to zero.

- That is, when the leverage ratio is 20, a 5 percent fall in the value of the bank assets causes a 100 percent fall in bank capital.

- If the value of the assets declines by more than 5 percent, assets fall below liabilities, sending bank capital below zero. The bank is said to be *insolvent*.

- The fear that bank capital may run out, and thus that depositors might not be repaid in full, is what generates *bank runs* when there is no deposit insurance.

Capital requirement

- To avoid such cases of Bank runs/insolvency- bank regulators (central bank) require that banks hold sufficient capital-*capital requirement*

- The goal of a capital requirement is to ensure that banks will be able to pay off their depositors and other creditors.

- The amount of capital required depends on the kind of assets a bank holds. If the bank holds safe assets such as government bonds, regulators require less capital than if the bank holds risky assets such as loans to borrowers whose credit is of dubious quality

- During financial crisis period (2008-2009), declining house prices caused many banks and other financial institutions to incur losses on loans and mortgage-backed securities.

- Because of leverage, the losses to bank capital were proportionately much larger than the losses to bank assets.

- Some institutions became insolvent. These events had repercussions not only within the financial system but throughout the economy. In the aftermath of the crisis, many observers suggested that banks be subject to *higher capital requirements*

Money supply

- Central bank issue currency in the economy. Hence money supply increases as central bank issues currency which is held by the public

- Banks create money supply if they follow fractional-reserve banking

- Household decide how much money to hold in form of cash-in-hand and how much to deposit

- Money supply=f(central banks decision, banks decision on reserve to keep, HH decision on currency-deposit ratio)

- The **monetary base (**B) is the total number of currency (Rupees) held by the public as currency C and by the banks as reserves R. It is directly controlled by the Central Bank (RBI).

- The **reserve–deposit ratio (**rr) is the fraction of deposits that banks hold in reserve. It is determined by the business policies of banks and the laws regulating banks.

- The **currency–deposit ratio (**cr) is the amount of currency C people hold as a fraction of their holdings of demand deposits D. It reflects the preferences of households about the form of money they wish to hold

- Money SS= f(B,rr,cr)

- Money supply (M) = currency + Demand deposits =C+D
- Monetary Base (B) = Currency + Bank reserves = C+ R

- $\dfrac{M}{B} = \dfrac{C+D}{C+R} = \dfrac{\frac{C}{D}+1}{\frac{C}{D}+\frac{R}{D}} = \dfrac{cr+1}{cr+rr}$
- $\dfrac{M}{B} = \dfrac{cr+1}{cr+rr}$

- $M = \dfrac{cr+1}{cr+rr} * B$

- This equation shows how the money supply depends on the three exogenous variable- B, cr and rr

- Hence Money supply is proportional to monetary base. The factor of proportionality, (cr + 1)/(cr + rr), is denoted *m* and is called the money multiplier.
- $M = \frac{cr+1}{cr+rr} * B = m * B$
- *money multiplier*, *m*$= \frac{cr+1}{cr+rr}$

- Each rupee of the monetary base produces *m* rupee of money. Because the monetary base has a multiplied effect on the money supply, the monetary base is sometimes called *high-powered money*

Effect of monetrary base, rr and cr on money supply

1. The money supply is proportional to the monetary base. Thus, an increase in the monetary base increases the money supply by the same percentage.

2. The lower the reserve–deposit ratio, the more loans banks make, and the more money banks create from every dollar of reserves. Thus, a decrease in the reserve–deposit ratio raises the money multiplier and the money supply.

3. The lower the currency–deposit ratio, the fewer dollars of the monetary base the public holds as currency, the more base dollars banks hold as reserves, and the more money banks can create. Thus, a decrease in the currency–deposit ratio raises the money multiplier and the money supply.

- M=f(B (+), rr(-), cr(-))