

Chapter: CREDIT CREATION & MONETARY POLICY

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Learning outcomes

After you have read this chapter, you should be able to:-

- a) Acquaint with the role of a central bank in an economy.
- a) Explain the fractional reserve banking system.
- b) Understand the process of credit creation in an economy.
- c) Compute money multiplier, given the data.
- d) Tell about usefulness and impact of monetary policy in an economy.
- e) List various tools of monetary policy.

INTRODUCTION

Banks are the financial intermediaries in the economy whose primary task is the acceptance of deposits and provisioning of loans. The questions that usually come to one's mind is-how all banks operate; who controls all the banks; what quantum of accepted deposits is loaned out; who decides all that; how does it impact economy?

Reserve Bank of India, RBI is an apex bank controlling all the operations of all the commercial banks in the economy. RBI controls money supply & credit availability in the economy. After the recession of 2008, RBI has been consistently lowering CRR & repo rate. Why does RBI take such steps? The answer to this is, RBI injects money in the system but one likes to know how does it materialize that?

This chapter is an attempt to answer all the above stated questions. It **focuses on credit creation** by RBI in the economy in **Section 1** and the **usage** of different **macroeconomic tools to inject or eject money** from the economy in **Section 2**.

CREDIT CREATION

Commercial banks are different from other financial institutions as they have the ability to create credit in the economy. They accept deposits from public- a part of which is loaned out and the remaining is conserved as deposits. Banks are in reality capable of providing more loans than the amount of cash held by them. The questions that need to be answered are- what proportion of the total deposits of the bank is to be given as loans and what ratio is to be preserved as cash by the bank; how can banks expand loans by more than the quantity of cash they have; what mechanism is at work?

We would try to study the mechanism of credit creation in an economy in this section.

Central bank in India

Reserve Bank of India, the central bank, controls money supply in India in two ways. **Firstly**, RBI prints money and directly controls money supply in the economy and **Secondly**, RBI uses monetary policy as a tool to control money supply indirectly.

Along with the Central Bank, it also depends on the Depository Institutions (i.e.) Commercial banks and public that holds money either as cash at hand or deposits in bank.

Should access to credit be a Right?

2006 peace Nobel Prize winner M. Yunus, in his effort to create economic & social development from below, proclaims that credit is directly instrumental to economic development, poverty reduction and improved welfare of all citizens, and hence credit should be a human right. Yunus considers right to credit to be moral one, based on the fact that without access to opportunities that credit can provide there is little chance that the poor will be able to improve their position.

But liberation approach to human rights; opposes Yunus' focus on moral consequences of financial exclusion. Libertarian stresses that individual rights of leader are violated. A large group of academics & experts challenge the urgent need of credit for all as it does not great a good or service. Maren-Hudon provides an alter rate approach of a goal– right system to credit.

Behavior of RBI in macro economy

Reserve Bank of India comprises of **two** departments viz. Issue Department & Banking Department. *Issue Department* relates to the sole function of currency management. *Banking Department* deals with rest of the banks in the country and provides an impact of all functions of the Reserve Bank.

RBI's Issue Department's balance sheet is as follows:-

Reserve Bank of India

Balance Sheet as on 30th June 2012

(Rs. Thousands)

Liabilities		Assets	
Notes held in banking Department	89,169	Gold coin & bullion	760,096,797
		Foreign Securities	10261,966,851
			11022,063,648
Notes in circulation	11034, 645,327	Rupee coin	2,206,548
Total Notes Issued	11034,734,496	GOI Rupee securities	10,464,300
Total liabilities	11034,734,496	Total Assets	11034, 734, 496

Source: RBI's website

On the right hand side of the balance sheet are the Reserve Bank's assets- what it owns. Its assets comprise of gold coins & bullion, foreign securities, rupee coins, government securities & commercial paper. On the left hand side is RBI's liabilities- what it owes to others. Currency issued by RBI – either held by public or in the Banking Department is a debt obligation of the RBI.

Likewise, in Banking Department's balance sheet, assets are securities purchased & investments made and notes held by it (Rs. 89,169 as shown in balance sheet of Issue

department). Liabilities comprise of reserve deposits. These reserve deposits are liabilities of Reserve Bank and assets of commercial banks as these are deposit accounts at Reserve Bank held by commercial banks.

For simplification, from here on we will assume no difference between Banking and Issue department and combined balance sheet will be considered for the two departments. Let us set the following example that would be applied to almost any currency and Central bank.

Central Banks Balance Sheet*

Liabilities	Rs.	Assets	Rs.
Currency held by non bank public	700	Securities	900
Vault cash held by bank	100		
Reserve deposits	200	Gold	100
Total liabilities	1000	Total assets	1000

*The above balance sheet contains selected items, which would be required for further analysis.

The sum of reserve deposits and currency (including both currency held by public and vault cash held by banks) is called as the monetary base or also known as high-powered money denoted by H.

$$H = C + R \dots\dots\dots(1)$$

Where,

H is high-powered money

C is currency

R is Reserve deposits

Next, consider the balance sheets of all commercial banks in the private sector. Suppose all banks are combined together and their consolidated balance sheet looks like the following:-

Consolidated Balance Sheet of Banks

Liabilities	Rs.	Assets	Rs.
Deposits	3000	Vault cash	100
		Reserve Deposits	200
		Loan	2700
Total Liabilities	3000	Total Assets	3000

Banks assets consist of vault cash & reserve deposits both of which appeared as liabilities on central banks balance sheets plus loans that banks have extended to the public. Banks liabilities consist of deposit accepted from the public. The money you deposit in your bank account is your asset while a liability for the particular bank.

RESERVES

Out of total deposits of Rs.3000, banks kept Rs.200 as reserve deposits &Rs.100 as vault cash to meet the demands for withdrawals by depositors. This is known as bank reserves. It is 10 % of the total deposits. How one fixes this reserved deposit ratio of 0.10 (=300/3000)?

Why don't banks keep entire deposits as reserves? Depositors can write cheques of the amount equivalent to their deposit money or withdraw the entire deposit money. If banks reserve the entire deposit money, banks are said to be following 100% reserve banking.

But banks anticipate the withdrawal demand by all sorts of depositors and then what amount would be held as reserve deposits is decided. For example, there are **three** depositors viz. A, B & C and each have the same amount of deposits in their respective accounts. A withdraws his entire salary every month, B withdraws half of his salary &C withdraws none. In this case, Banks would decide 0.50 as reserve deposit ratio so as to meet the requirement of their depositors. In this case, a generalization for all customers is made & then rest of the money is lent out by banks.

Bank Runs

If suppose there is a spread of rumor that a bank would not be able to honor cash requirement of their depositors; then all depositors would rush to the bank so that they do not lose on their money. They do not want to lose on their money. Since this is known as run on banks follow fractional reserve banking system; they would not be able to actually honor all withdrawal requirements. Final outcome would be panic in the economy. Bank runs were evident at the time of great depression 1929 & Great Recession 2008.

To avoid such a situation, RBI in India functions as lender of last resort & so does every central bank in world. Compare this with FDIC in US.

As in our example, reserve deposit ratio is 0.1, which is less than 1; this is known as ***fractional reserve banking system***. Every bank follows fractional reserve banking deposit because keeping 100 % of their deposits would mean they perform a function of safe vault and would earn no profit or a very low profit of central bank given them some interest rate on such reserve deposits. And in an economy such reserve deposit ratios are set by central bank of an economy.

RATIOS APPROACH TO CREDIT CREATION PROCESS

Suppose there are only private banks in an economy that follows fractional reserve banking system with reserve deposit ratio of 0.10. Suppose one of the banks, i.e. bank A accepts deposit equivalent to Rs. 100 & keeping reserves of 10 %; bank loans out the rest. Therefore, Bank A's Balance Sheet would look like the following:

Bank A's balance sheet

Liabilities	Rs.	Assets	Rs.
Deposits	100	Reserves Loans	10 90
Total Liabilities	100	Total Assets	100

Now this Rs.90, which is loaned out to anybody in the non-bank public is deposited in borrower's bank, say, bank B.

Bank B's balance sheet after accepting deposit and lending out money to public after keeping reserves would appear like the one below:

Bank B's Balance sheet

Liabilities	Rs.	Assets	Rs.
Deposits	90	Reserves	9
		Loan	81
Total Liabilities	90	Total Assets	90

This process of credit expansion will continue, as now this Rs.81 would be deposited in next borrower's bank & so on. Let's try to figure out what will be the amount of deposits & loans in the end?

Bank	Deposit	Reserve (rD)	Loan/Credit (D-rD)
A	100	10	90
B	90	9	81
C	81	8.1	72.9
D	72.9	7.29	64.61
:	:	:	:
:	:	:	:
Total	1000	100	900

Total of deposits = Rs. (100+90+81+72.9+.....)

=Rs. (100+0.4(100)+0.9 (0.4x100)

+0.4(0.4x0.9x100)+.....)

$$= \text{Rs.}100/1-0.4 = \text{Rs.}100/0.1 \text{ (by G.P.'s formula adding upto infinity)}$$

$$= \text{Rs.}1000$$

Total of loans = (90+81+72.9+64.61.....)

$$= (90+0.9 \times 90) + 0.9(0.9 \times 90)$$

$$= 90/1-0.9 \quad \text{(by G.P.'s formula adding upto infinity)}$$

$$= 900$$

Total of Reserves =Rs. (10+0.9x10+0.9 (0.9x10)+.....)

$$= \text{Rs. } 10/1-0.9 \text{ (by G.P.'s formula adding upto infinity)}$$

$$= \text{Rs. } 100$$

By *generalizing* the totals, we get:

$$\text{Total Deposits} = \text{First deposit}/r$$

So here 1/r is the multiplier (Deposit & credit multiplier).

One bank in a multi-bank system cannot produce a large multiple expansion of deposits based on an original accretions of each when other banks do not also expand their deposits. In the banking system in this example, a multiple increase in deposit money is created when all banks with excess reserves (i.e. money left after keeping a required reserve ratio of 0.1) expand their deposits in step with each other.

CASH DRAIN IN PROCESS OF CREDIT CREATION

In the above setup, the implicit assumption was that depositor does not wish to hold cash out of the deposits. But in reality, public wishes to hold a proportion of cash, say, equal to 10 percent of the size of its bank deposits. How does this impact the process of credit creation?

As we already know, high powered money, is sum of currency & reserves (R)

$$\mathbf{H = C+R} \dots\dots\dots(1)$$

which means, that total cash is either held by the banks or the public. Let required reserve deposit ratio be r. Then,

$$\mathbf{R=rD} \dots\dots\dots(2)$$

Where,

D is the total deposits.

Let the public hold a fraction of its cash in banks,

$$\mathbf{C = bD} \dots\dots\dots(3)$$

Substituting equations (2) & (3) in (1) gives:

$$\mathbf{H = bD+rD}$$

&solving for D yields

$$\mathbf{D= H/b+r} \dots\dots\dots(4)$$

In Equation (4) deposit multiplier becomes $1/b+r$ (in case of cash drain), which is to be compared to previous deposit multiplier, $1/r$ where cash deposit ratio was assumed zero. In equation (4) if cash deposit ratio is assumed to be ZERO, deposit multiplier again becomes $1/r$. A positive value of b lowers the increase in deposits, as it is cash drained out of expansion process.

MONEY MULTIPLIER

The total money supply M in an economy is sum of deposits & Currency i.e.

$M = C+D$ (5)

$M=bD+D$ {from (3)}

$M=D(1+b)$

$M=(1+b)/ (b+r H)$ {from (4)}

So Money supply in an economy is linked to monetary base, H by following equation:

$M= (1+b) / (b+rH)$

Where $\frac{1+b}{b+r}$ is the money multiplier.

Money Multiplier in India

Money Multiplier is calculated by taking a ratio of broad measure of money M_3 to narrow measure of money M_0 . On Dec. 30, 2011; M_3 was Rs.71, 986.8 billion and M_0 was Rs. 14,200.5 billion.

$$\text{So Money Multiplier, } m = \frac{M_3}{M_0} = \frac{\text{Rs.71,986.8 billion}}{\text{Rs.14,200.5 billion}} = 5.0693(\text{approx.})$$

The following graph shows the money multiplier for the period April 2008 to April 2010:



Source: RBI's Report

In the above figure there are three phases. Phase I: April 2008 – August 2008; where money multiplier declined from 4.3 to 4.1 as CRR(Cash reserve Ratio) increased from 7.5% to 9%. Phase II: September 2008 – January 2010; where money multiplier increased to around 4.8. Since economy was hit by crisis and in response to that, RBI started easing policy rates like CRR (Cash reserve Ratio) was reduced to 4.75%. Phase III: January 2010 – April 2010; as economy started recovering RBI tightened policy rates again and hence as a result, money multiplier was 4.66 as on 9 April 2010.

The size of the money multiplier is greater, the smaller is the banks reserve deposit ratio, r and the smaller is the cash deposit ratio, b . Both b & r are the drains in the deposit or credit expansion process.

MONETARY POLICY

Monetary Policy is the policy of the Central bank of an economy that deals with the quantity of money to be supplied in the economy. Monetary Policy is an important tool to affect macro economy. Money supply has a direct one to one relationship with prices in the economy (result of quantity theory of money), which has an implication that, if Central Bank wishes to contain inflation rate in the economy, it can be achieved with the help of changing the monetary base of the economy. One of the *primary objectives* of monetary policy is to *contain inflation rate*.

Considering money supply and money demand as a function of interest rates, money demand slopes downward to the right while money supply is vertical. Money demand is negatively related to the interest rate as was observed in last chapter. Money supply is determined by central banks decision of high – powered money so it is fixed at some given level, irrespective of interest rates. For this consider the following figure.

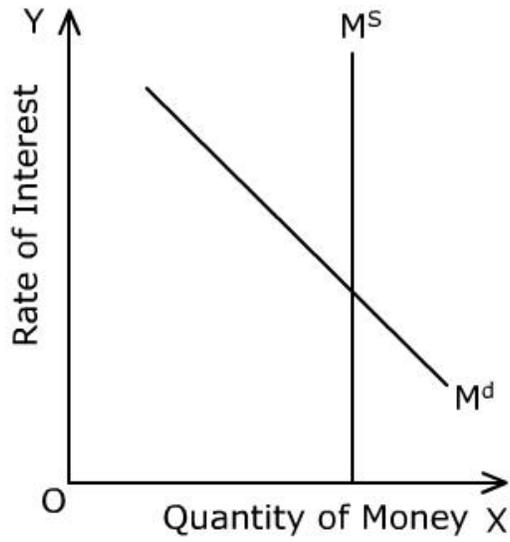


Figure 1

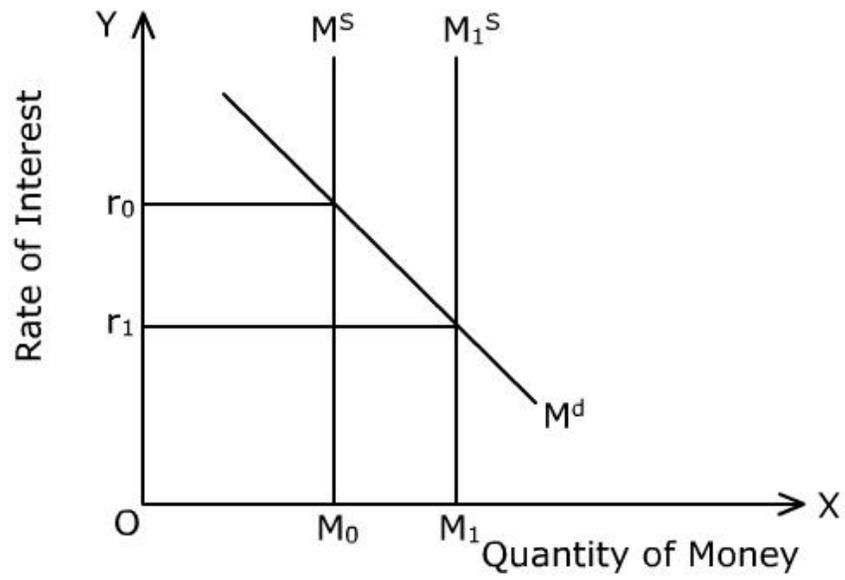


Figure 2

If Central Bank decides to increase the money supply in the economy; then m shifts to the right from m_0 to m_1 and equilibrium interest falls from r_0 to r_1 as shown in the above figure.

This fall in interest rate induces investment in the economy. From our knowledge from chapter on National Income Accounting; investment is a part of National Income is known. So as money supply in an economy expands, interest rate falls which induces investment in the economy and henceforth national income increases. So this could be the second objective of Monetary Policy.

As discussed in the last section of money multiplier, money supply is determined by three factors: H (High powered Money), r (reserve deposit-ratio) and b (cash deposit ratio). Central bank can change the monetary base of the economy or could change the requirement for reserve deposit.

MONETARY POLICY TOOLS

Central banks control money supply in the economy through the following policy instruments:-

1. Open Market Operations
2. Reserve Requirements
3. Repo and Reverse Repo rates
4. Discount / Bank rate

1. Open market operations

If RBI purchases securities from private investors, then they get currency or deposit with them as a result of this transaction, which means that it increases the monetary base and thus the money supply. This purchase of assets is known as open market purchase. The sale of assets to the public by the Central bank is called as the open market sale. It reduces the monetary base and the money supply. Open market purchases and sales collectively are called as open –market operations.

For example, if RBI purchases assets worth Rs.100cr. then monetary base increases by Rs.100 cr. Assuming a money multiplier of 10, total money supply increases by Rs.1000cr. in the economy due to RBI's open market purchases.

Understanding its mechanism

Panel 1:

Central bank				Commercial banks				Shyam.public			
Liabilities	Rs.	Assets	Rs.	Liabilities	Rs.	Assets	Rs.	Liabilities	Rs.	Assets	Rs.
Reserves	20	Securities	100	Deposits	100	Reserve	20	Debts	0	Deposits	5
Currency	80					Loans	80	Net worth	5		
Total	100	Total	100	Total	100	Total	100	Total	5	Total	5

Panel 2 :

Central bank				Commercial banks				Shyam.public			
Liabilities	Rs.	Assets	Rs.	Liabilities	Rs.	Assets	Rs.	Liabilities	RS.	Assets	Rs.
Reserves	15	Securities	95	Deposits	95	Reserve	15	Debts	0	Deposits	0
Currency	80					Loans	80	Net worth	5	Securities	5
Total	95	Total	95	Total	95	Total	95	Total	5	Total	5

Panel 3 :

Central bank				Commercial banks				Shyam.public			
Liabilities	Rs.	Assets	Rs.	Liabilities	Rs.	Assets	Rs.	Liabilities	Rs.	Assets	Rs.
Reserves	15	Securities	95	Deposits	75	Reserve	15	Debts Net	0	Deposits	0
Currency	80					Loans	80	worth	5	Securities	5
Total	95	Total	95	Total	75	Total	75	Total	5	Total	5

Table 1: Open Market operations

Let us look at Table1 to understand how open market operations affect money supply in the economy. In panel 1, Central bank has Rs.100 of government securities. Its liabilities consist of Rs.20 of deposits and Rs.80 of currency. With required reserve ratio of 0.2, Rs.20 of reserves can support Rs. 100 ($=20/0.2$) of deposits in commercial banks. Panel 1 also shows Shyam's financial position.

Now imagine that central bank decides to make open market sale of securities worth Rs. 5 to private investor Shyam. Shyam writes a cheque to the Central bank to complete this

transaction. Central bank's reserves are reduced by Rs. 5. (& reserves of commercial banks too). Such changes are shown in Panel 2.

The story does not end here. Since reserves are reduced to Rs.15 which now could support deposits of Rs.75 ($=15/0.2$), the final equilibrium of loans have been reduced to Rs.60. Banks don't call in loans but rather loans and deposits would be reduced by slowing down the rate of new lending as old loans come due and are paid off. Deposits have changed by Rs. 25 (from Rs.100 to Rs.75). In this example, change in money (Rs25) is equal to Money multiplier (5) times the change the reserves (Rs.5). Money supply defined by sum of deposits and currency decreased from Rs.100 to Rs.155.

Required reserve ratio

Changes in the reserves (discussed in the last section) bring changes in the money supply. When any Central bank changes the required reserve ratio in the economy, money multiplier changes and henceforth money supply changes.

Suppose central bank announces that required reserve ratio is reduced from 20 percent to 12.5 percent. The changes in the money supplies are shown in table 2.

Initially, when required reserve ratio is 20%, the balance sheets of central bank and commercial banks are shown in Panel 1 in Table 2. When required reserve ratio is lowered to 12.5%, then out of Rs.500 of deposits only Rs.62.5 might be kept as reserves and extra Rs.37.5 must be lent out which again creates deposits of Rs.37.5 times the money multiplier (8) i.e. deposits of Rs. 300 more are created.

Panel 1 : Required Reserve Ratio = 20%

Central bank				Commercial banks			
Liabilities	Rs.	Assets	Rs.	Liabilities	Rs.	Assets	Rs.
Reserves	100	Securities	200	Deposits	500	Reserve Loans	100 400
Currency	100						
Total	200	Total	200	Total	500	Total	500

Panel 2 : Required Reserve Ratio = 12.5%

Central bank				Commercial banks			
Liabilities	Rs.	Assets	Rs.	Liabilities	Rs.	Assets	Rs.
Reserves	100	Securities	200	Deposits	800	Reserve Loans	100
Currency	100						700
Total	200	Total	200	Total	800	Total	800

Table 2: changes in Reserve Deposit Ratio

So new deposits that could be supported with 12.5% required reserve ratio becomes Rs.800 and reserves equal 12.5% of deposits (Rs.800) i.e.Rs.100. Money supply has increased from Rs.600 (Rs.100 currency R.500 deposits) to Rs.900 (Rs.100 currency and Rs.800 of deposits).

Cash Reserve Ratio, **CRR** is the amount of funds that the banks have to keep with the RBI (Central bank of India). Statutory liquidity ratio, **SLR** refers to the amount that commercial bank requires to maintain in the form of gold or govt. securities before providing credit to customers.

Bank Rate

Bank rate, also referred as Discount rate, is the rate of interest, which a central bank charges on the loans that it advances to the commercial bank. When banks borrow, money supply increases. Central banks' lending of money to banks is called discount window lending. The higher the discount rate, the higher the cost of borrowing and the lesser the borrowings that the banks would want to do. If central bank wants to curtail the growth of money supply, it can raise the discount rate and discourage banks from borrowing from it, restricting the growth of reserves (and ultimately deposits).

CURRENT KEY POLICY RATES IN INDIA

CRR	:	4%
SLR	:	23%
Bank rate	:	8.25%
Repo rate	:	7.25%
Reverse repo rate	:	6.25%

Repo and Reverse Repo rate

Repo is a repurchase agreement, is the sale of securities to central bank together with an agreement for the commercial banks to buy back the securities at a later date. The repurchase price should be greater than the original sale price, the difference effectively representing interest is called repo rate. Reverse repo is the sale of securities by commercial banks together with an agreement for the central bank to buy back securities at a later date. An increase in reverse repo rate can prompt banks to park more funds with the central bank to earn higher return on idle cash. It is also a tool, which can be used by the central bank to drain excess money out of banking system.

SUMMARY

- Banks create money by making loans. When a bank makes a loan to a customer, it creates a deposit in that customer's account. This deposit becomes part of money supply. Banks can create money only when they have excess reserves and credit creation process is successful only when all banks loan out their excess reserves.
- Money supply in the economy is determined by monetary base times the money multiplier. Money multiplier is equal to $1/\text{required reserve ratio}$.
- Central bank pursues monetary policy and controls money supply in the economy. Central banks can either monetary base or the multiplier by its policies.
- Central banks have following tools to control the money supply: (1) through Open Market Operations (the buying and selling of already existing government securities); (2) by changing the required reserve ratio (reducing this ratio increases multiplier); (3) by changing discount rate (raising discount rate decreases money supply) and (4) by changing repo and reverse repo rate.

EXERCISES

Short answer questions

Q1. What happens to money supply in following situations?

- a. RBI buys bonds in the open market.
- b. RBI increases the reserve requirement.

Q2. Decide on whether RBI has taken correct step as per the requirement or not? What would be the outcome?

- a. During period of rapid inflation, RBI decreases the reserve requirement.
- b. During period of rapid real growth, RBI should inject money in the economy.

Long answer questions

Q1. Explain how banks create money.

Q2. What are the ways in which a central bank can influence the money supply?

Q3. What would happen to money supply if general public chose to hold (a) no cash, (b) no bank deposits?

Q4. What is money multiplier? What all factors determine its value?

Numericals

Q1. Look at the RBI's balance sheet, which is as follows:

Liabilities	Rs.	Assets	Rs.
Currency	150	Securities	350
Reserves	200		
Total	350	Total	350

Total deposits with the commercial banks is of Rs. 1500.

Calculate:

- Reserve deposit ratio.
- Value of money multiplier.
- If reserve deposit ratio changes to 12.5% then what will be the impact on macroeconomic variables.

GLOSSARY

- Bank Reserves*: Liquid assets held by banks to the demands for withdraws by depositors are called Bank reserves.
- Reserves deposits ratio*: Fraction of banks outstanding deposits that is kept as reserves is known as reserve Deposits ratio.
- Fractional Reserve Banking*: If reserve deposit ratio is less than 1 ie reserves are a fraction of deposits then such a banking system is known as fractional reserve banking.

- *Money Multiplier:* Money multiplier is the multiple by which the total supply of money can increase for every unit increase in reserves. The money multiplier is equal to $1/\text{required reserve ratio}$.
- *Open market Operations:* If central bank purchases from or sells to, private investors in the economy; money supply increase or decreases, respectively. These open market purchases and sale collectively is known as open market operations.
- *Cash Reserve Ratio:* Cash Reserve Ratio is the amount of funds that the banks have to keep with central bank
- *Statutory Liquidity Ratio:* Statutory liquidity ratio refers to amount that commercial bank requires to maintain in form of gold or govt. securities before providing credit to customers.
- *Repo Rate:* Repo (Repurchase) rate is the rate at which the RBI lends short-term money to the banks.
- *Reverse Repo Rate:* Reverse Repo rate is the rate at which banks park their short-term excess liquidity with the RBI.
- *Bank Rate:* Bank rate is the rate of interest which a central bank charges on the loans and advances to a commercial bank.

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