

BANKING SYSTEM AND ITS INSTRUMENTS

- We will see that how banking system plays a key role in determining the money supply. We will discuss various policy instruments that the central bank can use to influence the banking system and alter the money supply.
- We will also discuss some of the regulatory problems that central banks confront—an issue that rose in prominence during the financial crisis and economic downturn.
- **MONEY SUPPLY:** It is the quantity of money as the number of rupees held by the public, and we assumed that the Reserve Bank controls the supply of money by increasing or decreasing the number of rupees in circulation through open market operations.
- We begin by recalling that the money supply includes both currency in the hands of the public and deposits at banks that households can use on demand for transactions, such as checking account deposits. That is, letting M denote the money supply, C currency, and D demand deposits,
- we can write

$$\text{Money Supply} = \text{Currency} + \text{Demand Deposits}$$

$$M = C + D.$$

- To understand the money supply, we must understand the interaction between currency and demand deposits and how RBI's policy influences these two components of the money supply.
- **100 Percent Reserve Banking:**
 - We begin by imagining a world without banks. In such a world, all money takes the form of currency, and the quantity of money is simply the amount

of currency that the public holds. For this discussion, suppose that there is 1,000 of currency in the economy.

- Now introduce banks. At first, suppose that banks accept deposits but do not make loans. The deposits that banks have received but have not lent out are called **reserves**.
- In our hypothetical economy, 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 households deposit the economy's entire rupees 1,000 in First bank.
- First bank's **balance sheet**—its accounting statement of assets and liabilities— looks like this:

Assets	Liabilities
1,000	1,000

- **What is the money supply in this economy?** Before the creation of First bank, the money supply was the 1,000 of currency. After the creation of First bank, the money supply is the 1,000 of demand deposits. A rupee deposited in a bank reduces currency by one rupee and raises deposits by one rupee, 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:**

- Now imagine that banks start to use some of their deposits to make loans—for example, to families who are buying houses or to firms that are investing in new plants and equipment.
- The advantage to banks is that they can charge interest on the loans. The banks must keep some reserves on hand so that reserves 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 make loans. When they do so, we have **fractional-reserve banking**, a system under which banks keep only a fraction of their deposits in reserve.
- Here is First bank's balance sheet after it makes a loan:

Assets	Liabilities
Reserves 200	Deposits 1,000
Loans 800	

- This balance sheet assumes that the *reserve–deposit ratio*—the fraction of deposits kept in reserve—is 20 percent. First bank keeps 200 of the 1,000 in deposits in reserve and lends out the remaining 800.
- Notice that First bank increases the supply of money by 800 when it makes this loan. Before the loan is made, the money supply is 1,000, equaling the deposits in First bank. After the loan is made, the money supply is 1,800. The depositor still has a demand deposit of 1,000, but now the borrower

holds 800 in currency. *Thus, in a system of fractional-reserve banking, banks create money.*

- The creation of money does not stop with First bank. If the borrower deposits the 800 in another bank (or if the borrower uses the 800 to pay someone who then deposits it), the process of money creation continues. Here is the balance sheet of Second bank:

Assets	Liabilities
Reserves 160	Deposits 800
Loans 640	

- Second bank receives the 800 in deposits, keeps 20 percent, or 160, in reserve, and then loans out 640. Thus, Second bank creates 640 of money. If this 640 is eventually deposited in Third bank, this bank keeps 20 percent, or 128, in reserve and loans out 512, resulting in this balance sheet:

Assets	Liabilities
Reserves 128	Deposits 640
Loans 512	

- The process goes on and on. With each deposit and loan, more money is created. **Although this process of money creation can continue forever, it does not create an infinite amount of money.**

- Letting rr denote the reserve–deposit ratio, the amount of money that the original 1,000 creates is:

Original Deposit = 1,000

First bank Lending = $(1 - rr) \times 1,000$

Second bank Lending = $(1 - rr)^2 \times 1,000$

Third bank Lending = $(1 - rr)^3 \times 1,000$

Total Money Supply = $[1 + (1 - rr) + (1 - rr)^2 + (1 - rr)^3 + \dots] \times 1,000$
 $= (1/rr) \times 1,000.$

- Each 1 rupee of reserves generates $(1/rr)$ rupee of money. In our example, $rr = 0.2$, so the original 1,000 generates 5,000 of money.
- The banking system's ability to create money is the primary difference between banks and other financial institutions.
- Note that although the system of fractional-reserve banking creates money, it does not create wealth.
- When a bank loans out some of its reserves, it gives borrowers the ability to make transactions and therefore increases the supply of money. The borrowers are also undertaking a debt obligation to the bank, however, so the loan does not make them wealthier.
- In other words, the creation of money by the banking system increases the economy's liquidity, not its wealth.

➤ A Model of Money Supply:

Under fractional-reserve banking, the model has three exogenous variables:

- The **monetary base** B is the total number of money held by the public as currency C and by the banks as reserves R . It is directly controlled by the Federal Reserve.
- 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 to 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.

We begin with the definitions of the money supply and the monetary base:

$$M = C + D,$$

$$B = C + R.$$

- The first equation states that the money supply is the sum of currency and demand deposits. The second equation states that the monetary base is the sum of currency and bank reserves.
- To solve for the money supply as a function of the three exogenous variables (B , rr , and cr), we first divide the first equation by the second to obtain

$$M/B = C+D /C+R$$

Then divide both the top and bottom of the expression on the right by D .

$$M/B = (C/D+1) / (C/D+R/D)$$

- Note that C/D is the currency–deposit ratio cr , and that R/D is the reserve–deposit ratio rr . Making these substitutions, and bringing the B from the left to the right side of the equation, we obtain

$$M = (cr + 1)/(cr + rr) \times B$$

This equation shows how the money supply depends on the three exogenous variables.

- We can now see that the money supply is proportional to the monetary base. The factor of proportionality, $(cr + 1)/(cr + rr)$, is denoted m and is called the **MONEY MULTIPLIER**.

So, we can write

$$M = m \times B.$$

- Each rupee of the monetary base produces m rupees of money. Because the monetary base has a multiplied effect on the money supply, the monetary base is sometimes called **high-powered money**.
- Here's a numerical example. Suppose that the monetary base B is 800 billion, the reserve–deposit ratio rr is 0.1, and the currency–deposit ratio cr is 0.8. In this case, the money multiplier is

$$m = (0.8 + 1) / (0.8 + 0.1) = 2.0,$$

And the money supply is

$$M = 2.0 \times 800 \text{ billion} = 1,600 \text{ billion}.$$

- Each rupee of the monetary base generates two rupees of money, so the total money supply is 1,600 billion.
- The money supply is proportional to the monetary base. Thus, an increase in the monetary base increases the money supply by the same percentage.
- The lower the reserve–deposit ratio, the more loans banks make, and the more money banks create from every rupee of reserves. Thus, a decrease in the reserve–deposit ratio raises the money multiplier and the money supply.
- The lower the currency–deposit ratio, the fewer rupees of the monetary base the public holds as currency, the more base rupees 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.

➤ The Three Instruments of Monetary Policy:

- Till now, we made the simplifying assumption that the Federal Reserve controls the money supply directly. To do this, the Fed has at its disposal three instruments of monetary policy: open-market operations, reserve requirements, and the discount rate.
- **Open-market operations** are the purchases and sales of government bonds by the Fed. When the Fed buys bonds from the public, the dollars it pays for the bonds increase the monetary base and thereby increase the money supply. When the Fed sells bonds to the public, the dollars it receives reduce the monetary base and thus decrease the money supply. Open-market operations are the policy instrument that the Fed uses most often.
- **Reserve requirements** are Fed regulations that impose on banks a minimum reserve–deposit ratio. An increase in reserve requirements raises the reserve–deposit ratio and thus lowers the money multiplier and the money supply. Changes in reserve requirements are the least frequently used of the Fed’s three policy instruments.
 - CRR AND SLR???
- The **discount rate** is the interest rate that the Fed charges when it makes loans to banks. Banks borrow from the Fed when they find themselves with too few reserves to meet reserve requirements. The lower the discount rate, the cheaper are borrowed reserves, and the more banks borrow at the Fed’s

discount window. Hence, a reduction in the discount rate raises the monetary base and the money supply.

▪ REPO RATE AND REVERSE REPO RATE???

- Although these three instruments—open-market operations, reserve requirements, and the discount rate—give the Fed substantial power to influence the money supply; the Fed cannot control the money supply perfectly. Bank discretion in conducting business can cause the money supply to change.
- Fed did not anticipate. For example, banks may choose to hold **excess reserves**—that is, reserves above the reserve requirement. The higher the amount of excess reserves, the higher the reserve–deposit ratio, and the lower the money supply. As another example, the Fed cannot precisely control the amount banks borrow from the discount window. The fewer banks borrow, the smaller the monetary base, and the smaller the money supply. Hence, the money supply sometimes moves in ways the Fed does not intend.