We saw in the last lecture that money supply comprises of both currency as well as bank deposits. We shall now see how commercial banks can influence the level of money supply by making loans, since the process of making loans creates additional bank deposits.

How do banks create money? (See Fig. 12.2, Parkin page 292, to see how money-creation takes place in a one-bank economy)

1. Suppose a person deposits $100 in a bank.
2. Let the reserve ratio (RR) that the bank is legally required to have is 20%. So, it keeps 0.2*$100 = $20 in its vault and lends out $80.
3. Now, the person taking this $80 as loan deposits it in another bank (till he spends it on something).
4. This bank keeps $16 out of the $80 in its vault (due to the RR), and lends out $64.
5. The person who borrows this $64 deposits it in yet another bank, which lends out 80% of it, yet again.
6. This process gets repeated over and over again.

Thus we see that an initial deposit of $100 has created additional deposits worth more than $100 in the banking system due to the lending activities of banks. As deposits are a part of money supply, these additional deposits figure in the amount of money supply of the economy. We note that the RR acts as a leakage to the process of deposit-creation, and hence the power of the banking sector to create money supply in the economy is crucially dependent on the RR rate.

So, the change in money supply due to an initial change in deposits is given by the total change in deposits brought about by that initial change.

Let us call total money supply \( M \), total deposits \( TD \), the \%age of deposits lent out (1-reserve ratio) as \( r \), and the initial level of deposits \( D \). Then we have the following:

\[
\Delta M = \Delta TD = \Delta D + r(\Delta D) + r(r \Delta D) + \ldots \ldots \\
= \Delta D + r \Delta D + r^2 \Delta D + r^3 \Delta D + \ldots \ldots \\
= \Delta D (1 + r + r^2 + r^3 + \ldots \ldots) \\
= \Delta D/(1 - r) \quad \text{(By the formula of the sum of an infinite geometric series)}
\]
So, $\frac{\Delta M}{\Delta D} = \frac{\Delta TD}{\Delta D} = \frac{1}{1 - r} = \frac{1}{RR} = \text{The Money Multiplier}$

Where the money multiplier is the amount an initial change in deposits is multiplied by, to give the change in money supply.

**The Money Market**

*The demand for money:* It is the relationship between the quantity of real money ($/price level) demanded and the nominal interest rate (interest rate that is gross of inflation), other things remaining constant.

These ‘other things’ are RGDP (more RGDP means greater money demand to buy more goods & services) and financial innovation (availability of new financial products & services, like credit cards, ATMs, etc. leads to more money demand by simplifying the process of borrowing/lending).

*The money demand curve is negatively sloped. A change in the interest rate entails a movement along the money demand curve, while a change in the ‘other things’ entails a shift of the curve.*

(See Fig. 13.6 & 13.7, Parkin page 317)

As with the demand functions in other markets, the money demand function arises out a *utility maximization exercise* (of both households & firms in this case). Households & firms derive utility by holding/borrowing money (like the utility of having an asset to buy other goods & services, or the security of having liquid cash at hand), but holding money also has an *interest cost* attached to it.

*The supply of money:* It is the quantity of real money that is available in the money market. It is independent of the nominal interest rate and depends on the fixed levels of currency and deposits available in the economy at a given period.

*The money supply curve is a completely inelastic vertical straight line* at the level of real money supply that is available in the economy, given the level of currency and deposits in the economy. Thus, *money supply is constant for variations in the rate of interest.*

*Shifts of the money supply curve:* The money supply curve shifts for changes in the level of currency & deposits in the economy.

(See Fig. 13.9 & 13.10, Parkin pages 319-20)
**Equilibrium in the money market:** Equilibrium in the money market occurs when quantity of money demanded equals the quantity supplied. A market clearing nominal interest rate and quantity of real money describe the equilibrium.

*Note:* Given the vertical supply curve, it is the interest rate that adjusts to clear the money market.

**The relationship between the money market and goods market**

A variation in the interest rate in the money market does the following:

1. It varies investment and consumption expenditure (as the price of investment and capital consumption changes. A higher rate entails less expenditure).

   *Note:* Changes in the nominal interest rate changes the real interest rate in the short-run, when the price level is sticky.

2. It varies net exports through variation in the dollar exchange rate (for example, if the interest rate in the US increases to more than what is available in Japan, the Japanese would want to invest in the US and earn higher interest. To invest in the US they would need dollars, which they would buy on the foreign exchange market. This would increase the demand for dollars in the foreign exchange market and appreciate its value vis-à-vis the yen. But this would increase the price of US goods, in yen terms, to Japanese consumers. So they would import less of US goods, leading to a fall in export demand).

*But the above factors like consumption, investment, and net export expenditures figure in the demand-side of the goods market. So, for every equilibrium level of interest in the money market, we would get a level of these mentioned expenditures, which in turn would lead to a certain level of aggregate demand in the economy. Thus, the money market equilibrium affects the goods & services market equilibrium through its effect on the aggregate level of goods & services that are being demanded in the economy.*

**Thus, a change in the money market equilibrium affects the goods & services market equilibrium by shifting the demand curve in the AD-AS diagram.**

(See the diagram drawn in class)

*Recall:* Interest rate was one of the factors we kept fixed when we drew the AD curve in the goods market. So a change in the interest rate obviously leads to a shift in the AD curve.