Money and Banking
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Lecture - 7

I have defined money supply, so it is not very simple, it is quite complex, many things are there depends upon the definition, you are using M 1, M 2, M 3, M 4 traditional monetary aggregates. Then I talked about the new monetary aggregates. Late 90's it came 3, N M 1, N M 2, N M 3; even they conceptualized liquidity aggregates, which is the combination of monetary aggregates and something else.

I did not go into the details, because it is not very clear the items involved there to me then what I did was I was trying to go into the money supply more in the context of macroeconomics. And I took up the concept of velocity of money, which is equally relevant to the entire money supply in a country. One is the monetary aggregates, but the money supply consists of just not monetary aggregates, money supply consists of also the velocity of circulation of money.

Now that velocity of circulation of money along with monetary aggregates amount create, the total effective supply of money in the country remember. So, count this how much is it traveling on an average per annum is very important, because why money is required, the basic thing is money is required to transact goods medium of exchange. But, then money is also used for other functions, where the velocity somewhat gets reduced, because transaction of goods increases the velocity of money. I bought something from you, you took that cash bought something from him, he went in the evening and bought something from somebody else, but if money gets stored and not being out in circulation then the velocity reduces. It may still have a velocity, bank invest some where, bank gives out a loan etcetera, there are various leakages.

The question is where, who invented velocity, well the velocity one of the earliest discussions can be found in Irvin fisher's book. He was not looking for something called velocity, he was simply looking for the connection between money stock, which is monetary aggregate (( )) Central Bank print economy, I will tell you, how they later… How much they printed the stock of money and the total value of goods and services,

because what we found the total value of goods and services is much more than the stock of money.

So, to establish the connection the V variable came into existence. So, it became M V into P Y, which is also the quantity theory of money because it belong to the classical macroeconomics school. The quantity theory of money was the corner stone of the classical macroeconomists where, it simply said at any point of time output is given velocity is also determined given. So, prices are proportional to money supply, money stock basically M, M and P are proportional relationships that is the quantity theory of money.

Now, in this thing which is called quantity theory of money today M V is equal to P Y, he called that equation of exchange. Quantity theory of money, I think was termed in England. So, let me tell you more about it, around that time when fisher's equation was developing or being developed, early 20th century in U S and he came up with M V is equal to P Y where, V is found greater than 1, he said this is I do not know whether, he called it this is velocity of money, but this is not a constant for years.

Velocity of money is also variable may be a slow variable, changes slowly and what did he say, he said it is determined by institutional and technological development of a country. So, it depends upon the banking system, institutions, the central bank regulations, the central bank habits of printing money, central bank policy about how much M will be institutional factors. And technological development how good are the banking, today we have ATM tellers, automatic teller machines, ATM outlets. We have electronic money also, these are all technological developments, they developed through the discovery or invention of internet. Prior to that when, I was a per student when there was no internet automatic teller machines were there only, but no E money, E money did not exist, so various kinds of money developing.

So, all institutional and technological developments determine, what the value V is going to be that is Irving Fisher, you may not like it, you may not agree with it, but the point is this is what he was trying to say. And he was saying also particularly coming from U S where, cards have become popular for a long time, now it is not like India. So, he was saying that, if the economy uses more credit cards and various form of electronic money,

which I can say now lesser amount of cash will be required to buy things, you do not need the cash, cash may stay in the bank, it is not coming out.

I give the card the seller gives me a receipt alright, then takes the bill to the bank where, I have an account and he may also have an account there and the bank simply debits and credits to accounts, takes money from my account, puts it in his account, no cash use all internal. So, you can see velocity will come down so with technological improvements in some sense like cash and tech and institutional features we may come down.

On the other hand, I can see that, we can go up because we have automatic teller machines. So, (( )) now this without that machine would stop that use of cash, so you can also increase, it velocity of money automatic teller machines. So, V it becomes in means an imperical question as to what will happen. Now another thing is that with the chequing system use of cash has gone down, you would not believe me in India we use a lot of cash to pay the bills abroad, they do not use cards even. The bills at the end of the month arrive in an envelope containing another envelop inside it with the address at your door step in your mail box, you simply write a cheque and seal that envelop, which is already there and post it.

Even cards are not required to make the payments for all monthly payments can be made simply with cheques, telephone bill everything of course, bank loans and stuff you can make payments. Sometimes they are automatically deducted from your account, you give a permission bank automatically deducts it, you do not have to go to the bank to make the payment. Bank, if you give the instruction automatically end of the month some amount E M I will be deducted.

So, with this complexity velocity of money can become quiet an issue alright and why is an important, because that determines the effectiveness of money supply next. Around that same time, now you can see this dia this equation of exchange, if I play around like theoretical economist. I can play a game like this, which is important, which is exactly what was happening in England.

In England what was happening, they were not talking about equation of exchange and the relationship between total value of goods and services bought and sold in a year and the total stock of money, in England what they were doing is something quite different. And the thing they were doing is something, what interested them and I have met

economists or students, who studied there and they were lo they were a lot interested I do not think these days, but they may still be.

This is something their interest particularly in Cambridge from where Keynes john Maynard Keynes come, came and wrote the book the Cambridge economists were particularly interested in something called demand for money. And they were looking into variables that will affect the demand for money by the individuals of a country what motivates people to demand money, what are the variable which influence the quantum of demand of money, demand for money.

So, they were more into demand for money, which you have seen in macro economics. The L M curve has supply a money on one side and demand for money on the other side and famous Cambridge economist Keynes's contribution was the speculated demand for money, which did not exist in the classical macro economics alright. So, the demand for money, you just turn around this equation and you see the research going on and the work going on in England is. So, similar to what was going on in us although 2 different discussions were going on.

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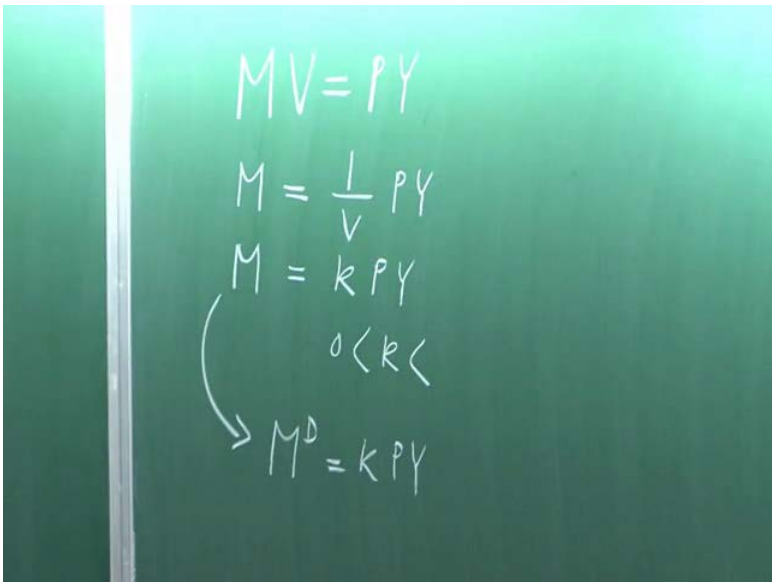

If I write fisher's equation as M V is equal to P Y M V is equal to P Y and I turn it around as M is equal to 1 over V P Y and call that K P Y where, K lies between 0 and 1, because V is greater than 1. So, K is between 0 and 1, then this equation M in Cambridge

was written like this demand for money is equal to K P Y where, demand for money is some proportion of the nominal income in the country.

Completely different interpretation, how much money do people demand, it is a proportion a fraction as a matter of fact. K is less than 1 of the total nominal income of the country, how much income I have will determine, how much money, I demand to buy goods and services.

So, fisher's equation like a clever person, I turned it around and it becomes a demand for money function then people say what macro economists do. This demand for money assuming an equilibrium condition is also equal to M the supply of money. So, supply equal to demand for money, I can measure that is nothing but a K of P Y a prop fraction of the total nominal income.

Now, you see that the velocity comes up in Irving Fisher, that money travels more time can be turned around into a simple behavior equation like, people how much money would they use. Demand for money means, how much do that they using demanding to buy goods, it depends upon the nominal income. The micro level that is to 2, completely different interpretation is coming out and this was the line of thinking in Cambridge.

But, they were not thinking together and 2 are very well connected, that the I demand money a fraction of my total income is a same thing as the total effective supply of money is equal to the total nominal income. And the money required to, but those nominal goods and services. Total amount of goods and services in nominal terms requires much lesser stock, because there's something called velocity of money more or less the same thing.

Now, I come to the demand for money what are these Cambridge economists are saying about demand for money. First of all you have seen that, it is a proportional it has a proportional relationship with nominal income, what is nominal income, income in money terms P into Y. And what is y real income, what is real income in macro economics all goods and services produced is real income remember.

Why is a physical volume of apples and oranges and cheers and cars and buildings produced, what is the nominal income the total value of those items in market prices. Because, when you are producing, you are generating income at the same time, you are

making payments. If some payments are not made to costs, the payments are made to yourself as income profit. So, the total value of goods is also total nominal income in the country. Same thing depends, which way you look at it a coin has a head side and a tale side, look it from the head side is one interpretation, look from the tale side is another interpretation, it is the same thing, it is the same coin nothing changes.

Now, two Cambridge economists were, particularly involved with this demand for money research and thinking. And they were, the teachers of Keynes Alfred Marshall and A C Pigou. Marshall was definitely Pigou probably was also a teacher, they were prolific writers they wrote. Marshall's book is in the library very interesting, Alfred Marshall's book, I do not know who, bought them 40 years back somebody bought them is longer available in the market is in our library, I have seen it.

It is called principles, you can check that out if you want, these are the god father's of economics professions Alfred Marshall's book is there in the library, I have seen it. So, Alfred Marshall and AC Pigou came up with an equation like this, which they called demand for money. And why do people demand money and they were going into many many things, they were saying first why people would be using money, because there is a utility for holding money.

If, you have cash there's an utility you get, over macro economics, you get utility from holding money, that is why people demand money. Second since, you get utility, you can store value in it, the other money function is that store a value function. Now, also people need money and how much money, they would need, they went into a mach much wider discussion is that they said, which I already told you in the beginning of this course, that money is part of something called wealth.

We usually look at money, because we need cash to buy things, but money has a much wider significance it is part of wealth. So, the money you have has to be compared with other kinds of assets, you can have you can have it in cash from money, you can have the money, which we call invested in a property, bought jewelries', some people rich people have gold bars, I do not have them then money for jewelry money goes into property money goes into the share the markets.

They are all kinds of wealth and money is actually, a part of wealth, this is the Cambridge thinking, which I told you earlier. So, the 11th of wealth also determines how

much money they demand, if somebody becomes wealthier in terms of property value, you will see their demand for money function will shift. Shift in the sense, they have now a tendency to spend more, because they know there is a back up reserved in terms of high value of property and other forms of wealth. My share value prices have gone up, I have not ye yet realized by selling them off, but the fact, they are going up, I may have a wealth effect here, which influences my number of trips trips to the restaurant. Remember it gets very tied up with other forms of wealth is it all right, what I am saying.

So, wealth effects the demand for money as wealth increases an individual needs to store more of it and money is one form in, which wealth can be stored all right. Assuming that nominal wealth is proportional to nominal income, they stated that wealth component of money demand is proportional to nominal income. Then they came back wealth then let us say nominal wealth of a person is proportional to nominal income, how much money I get, income I get per annum, that will determine how much wealth, I can have.

Therefore, we can set aside the wealth variable, I discussed it, but let set aside and come back to the equation where, nominal income is a good enough variable to determine, how much money I would demand. What I am saying is money would be determined by wealth then they say wealth has a proportional relationship to nominal income. So, I can keep out all that complication of wealth items and can just simply focus focus on nominal income, that is good enough for me to know, how much money I would demand and K is a proportionality fact. Now these 2 Cambridge economists cypher, did not assume such a stable velocity of money, what happened in fisher. Fisher say institutional factors, technological factors would determine the V value.

Now you know institutions in a country or technological factors in the country change very slowly, in 5 years you may see some change, in India institutional factor (( )) computer technological improvement institutionally change bank institution factors do not change, technology is changing fast and we opened up the economy to the west and other countries.

So, there is an incoming technology, which is changing fast. So, in our country, we may see V value changing following Irving fisher. Otherwise V is very stable does not change very quickly, but there's a big difference what Cambridge economists were, saying what determines K. K is the inverse of V, this is a mathematical relationship, Cambridge

economist never say K is V. They said K is K proportionality factor in the demand for money, fisher was talking about V in that equation of exchange.

But, V clever mathematicians can connect the 2 and can say V is 1 of a K or K is 1 of V, let us see what they have to say about K, which was there, which is the last thing, I have written on the board. And they were saying that the is very important that, which is very important that initially, they did not talk about rate of interest. They should have talked about rate of interest has an important determining factor of K, you know why rate of interest is a price of money.

Rate of interest goes up price goes up what you want do you want to demand more of it n. Present discounted value value like a business man I am talking, but initially they did not Pigou and Keynes Pigou and Marshall. But, one of their descendents their students like, you people god knows what will what will happen to me 10 years down the road. One of their students was john Maynard Keynes and he turned it upside down, he said an important factor there in the demand for money is rate of interest.

And he developed something called speculated demand for money extended. So, demand for money, it may not have talked much about K the velocity of money, but definitely brought in a very important variable, which do not exist here and now it has no connection with our because you add a component here and cannot turn around that equation to make it M V is equal to P Y, because you he added speculated demand for money where the key factor is rate of interest alright.

So, they also did not say much about the stability or K factor, they probably assumed more or less like Irving fisher is not going to change much. But, in the long run they may have had something in their mind, I have to read more and more, this is where, I get into research read Marshall and Pigou, that interest rate may have a role to play in determining k. But, Keynes said no just not long run in the short run interest rate is a very important factor in speculated demand for money.

So, what he wrote Keynes was this equation class some l, which is speculated demand for money function of rate of interest. And is completely now detached demand for money and Irving fisher's quantity theory, this is where I teach macro economics classical model different from the K M C L model. After Keynes's contribution it is a

very different thing Keynes said even in the short run rate of interest is an important factor that is a revolutionary thinking.

Interesting thing is Keynes was a student of Marshall and Pigou, but a student learnt something and did something quite different, when he started thinking alright. So, in some sense Cambridge economist may have allowed, some short run Cambridge economist may have allowed long run and some short run fluctuations in K. Because, of the tie between the tussle between money and non money wealth most to in the long run Irving fisher was very clear that these are technological factors and institutional factors, which determine V.

And Cambridge economist were not so clear, but they had some some cushion on money versus non money storage or wealth components where, interest rate may play a role. But, Keynes when he came he detached the entire thing and introduces the interest rate right, in the short run as an important factor whatever be K. Now, we need to check out velocity of money India the data, that will be very interesting what will be the velocity of money data alright, any question that you may like to ask me.

Similar, kind of research was going on except 2 angles the approaches are very different, anything you want to ask me, what I do I go back and forth with an individual and aggregate by summing them up. It may be true at the individual level, what demand for money will have in terms of you spending habits that is where, you are demanding money, you are not demanding money for nothing you are demanding money because you have to buy things, you spend depends upon the income you have.

So, it is true at the individual level as well as the macro level it is very simple here. V this is what, I was saying Irving fisher said it varies very little in the short run, only in the long run it can change. Because, V is determined by institutional factors banking systems, central bank regulations and technological developments. But, that V when converted to K created some confusion the Cambridge version was saying K can also vary in the short run, but it will vary in the long run.

Because, of changes both predicted they will change in the long run, but the short run variation was not there in Irvin fisher. Cambridge economist were saying that there may be a problem between money and non money assets where, rate of interest may play a role. If rate of interest is low you may demand more money, but at the same time you can

see, if rate of interest is low, you may be putting money in shares property, that yields, you more returns.

So, the competing returns determine like when, I go and buy goods in the market, I look at the competing prices and I decide also by looking at the quality and choose a product. Now, interms of my basket of wealth where, to put the wealth, either in money from, cash form or in property or gold or whatever, I may look at the competing returns. And one of the factors determining the competing returns is the interest rate, because the interest rate is worth a price of money and interest rate is also a return on say fixed deposits etcetera or bond interest rates financial assets. So, short run it can also change and if K changes in the short run, you now use a mathematical logic, K is connected with V, V will also change in the short run.

But, Irvin fisher was saying V will not change in the short run, V is very the much a long run phenomenon and a long run phenomenon at least takes a few years clear is a discrete variable yes absolutely right. Lot of activity hmm accounted in what sense, what is the purpose, you want to know how much money is used not using electronic money and how money is used using electronic money transaction are same.

But, electronic money would lower velocity, cash is actually, not used account to account transfer and it is reducing the usage of cash, which you otherwise would be carrying going to the market and buying the goods cheques have reduced usage of cash electronic money have reduced usage of cash further. So, we would expect with more development in electronic money and all that the velocity to come down,, but at the same time we have automatic teller machines, which are saying, you can use cash more, you do not have to wait for the bank to open tomorrow.

So, there is a there is one increasing it, one diminishing it, the net effect, we have to find out and I will give you data, I will show you that my job here is not only to teach you, this theoretically, which I as a student learnt. But, with internet and projectors and computers, I will have slides for, you all these data, I will show you. So, just wait, let us see what is happening in India, because this is India is a reference point here, these concepts are general concepts, you go to US, you talk about this.

But, the reference point in terms of data, I have used Indian data one day, when I have more time, I can bring in US data British data, but lot more work, I am not doing it, my

Indian context is some institutional features and the data. Because, it is easily accessible, but the concepts that, I am teaching you are just not specific to India only, they are much more general. Very important, when you talk about a monetary aggregate or even a monetary base that, I would talk about only monetary base not monetary aggregate.

There are 2 ways just like a coin, which has a head and a tale, it is the same thing coin a monetary base, you can look at it from the head side or the tale side, what I mean is you can look at monetary base the way, I defined it from the use aspect. How you are using monetary base and also, you can look at monetary base from the source aspect from where and what is creating the monetary base.

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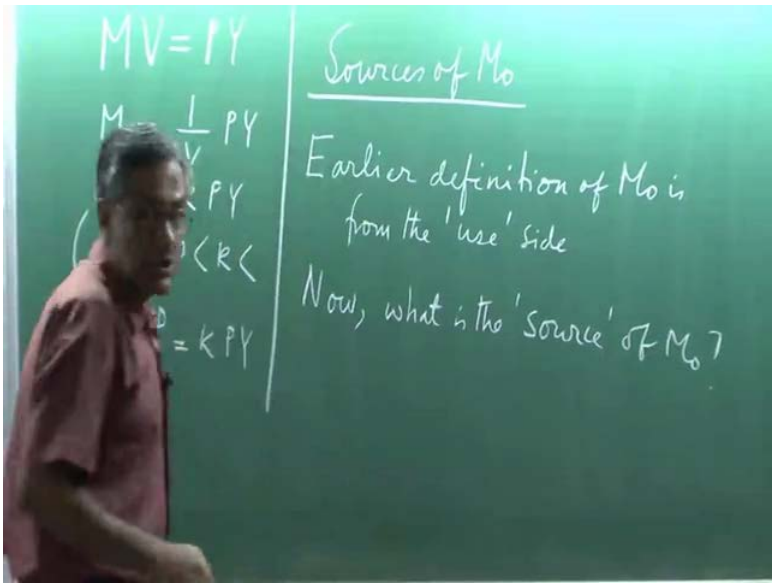

So, what I would go into next is a discussion more detailed discussion on the sources of monetary base, sources of monetary base what I have defined earlier, when I defined monetary base. What did I do, monetary base is equal to currency in circulation plus bankers deposits with the RBI plus other deposits, you know what this definition is how monetary base is held. Part is currency in circulation, part is bankers deposits with RBI part is other deposits, that definition of monetary base is from the point of view of the use of monetary base.

So, the earlier definition of M not is from the use side, how you are using it the monetary base, what I will talk about now, what is the source of monetary base. There is a reason why, I will do that what, I will talk about now, what is the source of monetary base, why

is it important, because the monetary base is the foundation of monetary aggregates which we call money supply. If monetary base changes like in a earth quake, the super structure changes, it falls there was an earth quake in Iran.

Buildings fell people died, I am not saying monetary base changes then people die, but what I am saying, if the base changes the super structure also changes and the connection is I am coming that is the final stage of this topic, the connection between the 2. So, what I am saying is the, if the sup base monetary, base changes what changes it, because what economists are involved with and macroeconomics students would know this all of you.

That, if M changes there are dynamic changes, in the economy in a static I SLM frame work, we have seen it, that actually there are dynamic changes. In a static I SLM frame work, we have seen, if M changes nothing else changes L M shifts, if L M shifts interest rate changes, output income changes, aggregate demand changes, again price change, employment change, whole range of chain of changes continue.

So, the central bank, which is the central monetary authority of a country is very alert all the time what is happening to the monetary aggregates, because if they are changing and changing, unhealthily. Changing in the un desired direction, which I do not want then it can effect play havoc with the economy more over monetary base change or monetary aggregate change superstructure, which a monetary aggregate change are sometimes controlled changes are there, which are called policies.

Deliberately to influence the economy, which was going in this direction to turn it around in the other direction deliberately, so central bank has 2 kinds of concerns about monetary base. One how is it changing keep an eye on it, you do not want undesirable changes. Second we want some definite desired changes now, like somebody is ill giving an antibiotic and turn around the health of that person, kill the bacteria inside him give more vitamins get him healthy have get him up on his feet, do some physical exercise let him again start his life.

So, monetary policy is a very important thing. So, now, the question is, if you want to control the monetary aggregates, why do not you go down to the fundamental from where, the change is coming then you can adopt the proper policies. So, what I am going to get into earlier, I told you only the use of monetary base definition. Now, I am going

to tell you about the sources of monetary base from where, it is coming like I am falling ill antibiotics are giving to recover me from illness.

But, it is important to know, why I am falling ill, because there is certain places, I am going a certain kinds of food I am eating, a certain habits I have developed, which make me ill, which I should know, do you understand, what I am saying clear. So, next discussion, which I have is a very important discussion, it is a discussion on the sources of monetories is very important.

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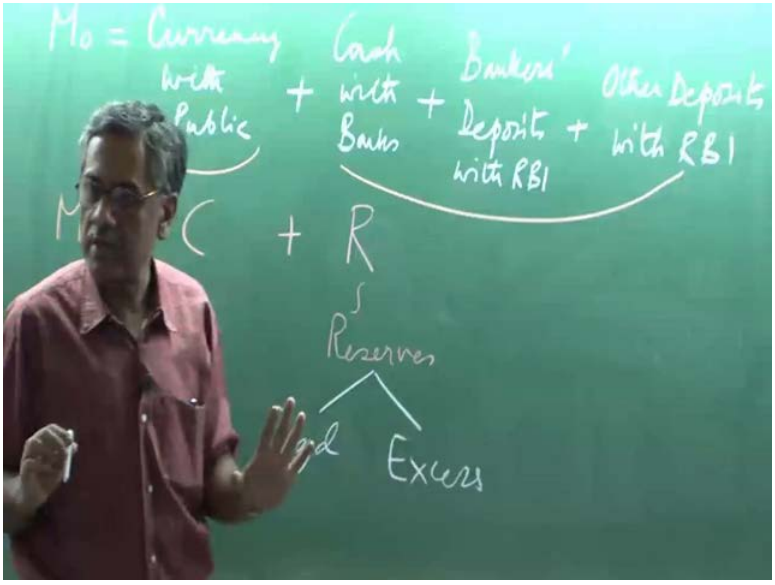

Now, I have to set it up the model it is like a small algebraic model how did I define monetary base earlier recall, how did I define monetary base. I said monetary base has currency with public plus cash with banks plus bankers deposits with RBI plus other deposits with RBI. I said that good, let us call currency with the public's, this variable C and this entire thing R where, R is reserves.

They are I am going to call them reserves, reserves contain (( )) cash bank cash (( )) RBI (( )) plus some cash of other institutions, international institutions with RBI, lying with RBI. So, I am going to call this entire thing R and this thing C. So, I am going to define M not equal to C plus R redefining, it is easy for me to go into a discussion. Now, if you go into a monetary economics book, which is monetary economics, there is an area like macroeconomics and I am teaching money banking, which is in between macro and monetary economics.

If you go into monetary economics, which I used to teach here, when I arrived here, they asked me to teach a P G course, I used to teach a monetary economics course. Going to monetary economics, you will often here, when you open these chapters with respect to money supply and banks and etcetera. The word reserves, you will hear that and in the context of reserves, they use expressions like required reserves and excess reserves 2 expressions.

Required reserves are the bankers deposits with RBI, which banks are suppose to do compulsorily, because of C and R and other requirements with RBI required reserves like you are required to come to class. And excess reserves are like the optional ones, you can do whatever, you want to do in the evening, you can spend time in the canteen, you can go to the new sack, there are new food outlets, they have opened I do not know whether, it is still there, they have have they opened the food outlets and I saw an ice cream stall there once.

And some food also one evening, I went is it open. So, you can go there alright (( )), you can go there. So, those are like excess reserve, excess reserves usually consist of banks cash that is lying with them, which are not with RBI, which they have kept for various purposes excess reserves. The problem (( )) what are other deposits, in the banking system other deposits are not important, because the banking system in the RBI particularly in the banking system, which what is the banking system.

Banking system consists of all commercial and cooperative banks and the central bank that is the banking system alright. Now other deposits in India it is a very small number, I have seen that less 1 percent. So, if I, if this is probably something, which is peculiar to India, now if you go to the universal monetary theory, you hear about reserves are being 2 types, required reserves and excess reserves. So, if I accept that required reserves and excess reserves, if I accept that and if you allow me to make a simple assumption that other deposits, I am going to ignore. Because, other deposits is a very typical of Indian economy or Indian banking system and it is a very little amount less than 1 percent, I will show you that.

So, if you ignore that then I have C consisting of currency with the public plus reserves cash with banks and bankers deposit with RBI as reserves and I am ignoring other deposits. This is in confirmative with the monetary economics literature, the theoretical

literature where, they have developed various models etcetera and they discussed that monetary economics is like a branch of macroeconomics all right.

And we use macroeconomic theories often the models that, you have seen I S l M etcetera to develop various things then I am going to begin discussion tomorrow from this stage where, I would say monetary base from the definition that you have seen all right. Consists of currency with the public plus reserves and reserves are 2 parts only other deposits I would ignore, because empirically it is a very small number and in the monetary economics literature it does not exist.

It is typical of India every country has the right to develop a definition to their, which suit them, which they like alright. It need not be there in U S in China and Japan and Germany yes, I we have it. Now, I am trying to bring the monetary theory here, if I try to bring the monetary theory here. The general equations other deposits, I am going to ignore and I am happy other deposits, I can ignore because empirically it is a very insignificant number (( )) ignore empirical reserve the numbers (( )).