Money and Banking
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Lecture - 11

On money supply… Now we have heard about money supply in macro course, but we really do not know them, we just call that a variable M and money is the cash as we carry. But when we get into more details about money supply, you realize that the practices in a country like India, like other countries there are various kinds of definitions of money supply. And in simple words, money supply is an aggregate arithmetical addition of items, you change items you get a different definition of money supply. So, what I did was first defined money supply the way it exists in India today. And I told you there are two money supply variables which are most popular - the narrow money M 1 and the broad money M 3. And two more traditional aggregates are there M 2 and M 4; we do not use usually M 2 and M 4. I would not see much practice of using M 2 and M 4.

Then I talked to you I told you about how late nineties, there was a working group at RBI under the chairmanship of the then governor of RBI - Dr. Y. B. Reddy. They came up with some new definitions of money supply to accommodate the changes that are that were happening in the Indian economy. Indian economy went through a globalization, privatization and liberalization, three kinds of things since 1991 June and that industrial economic policy changed things over a period of ten years or so. So they are 9 years, 8 years.

So, they came up with new definitions of money supply called N M 1, N M 2, N M 3 and what surprised me is that on RBI site, they also have very similar to money supply something they called liquidity aggregates not monetary aggregates. These are money supply's are called monetary aggregates. They are called liquidity aggregates which are also containing components of money supply and for reasons which are not very clear why liquidity aggregates were formed, but there are liquidity aggregates which take into account all kinds of money market instruments. Money market instruments, you do not know because that is coming up in next topic. So, if you open liquidity, aggregates on RBI site, you will see there are some components which were there in monetary

aggregates or new monetary aggregates, and there are things which you never heard before and you will hear in the next topic liquidity aggregates.

Now, what is not clear to me in what context RBI make use of these liquidity aggregates. Monetary aggregates they use normally when they talk about monetary policy, it is very important to keep track of like a person's health you want to keep a person's health observed, you take into the heartbeat, take the pulse rate what you say the pressure other blood profiles, you keep check on that. In case of a macro economy and particularly monetary policy, which is the central bank responsibility not governments responsibility central banks responsibility monetary policy. Fiscal policy is governments responsibility, monetary policy is central banks responsibility central bank keeps track of monetary aggregates and they control them alright they expand them, they contract them etcetera.

And monetary policy will become more clear in the next topic, how central bank operates monetary policy in India. Next topic the following topic this is my essentially this is what I have done in this course. Now and then I went into some nice small simple theoretical [FL] manipulations or derivations where I told you about the connection between something called monetary base and monetary aggregates. And I came up with two simple multipliers called money multipliers; one is the simple money multiplier the connection between M naught and M naught, M 1 and M naught and the complex money multiplier the connection between M 3 and M naught. And if you open government documents they also have a chapter like economic survey monetary policy in India or the RBI handles it. You will see they are extensive data and information on these money multipliers plots like mine plots etcetera they have that. So, I went into the money multipliers then what I was doing I was trying to just show you the data aggregate data on these variables multipliers, money supply etcetera, in the last ten 15 20 years and what we strikingly noticed is the difference between M 3 and M 1 number one.

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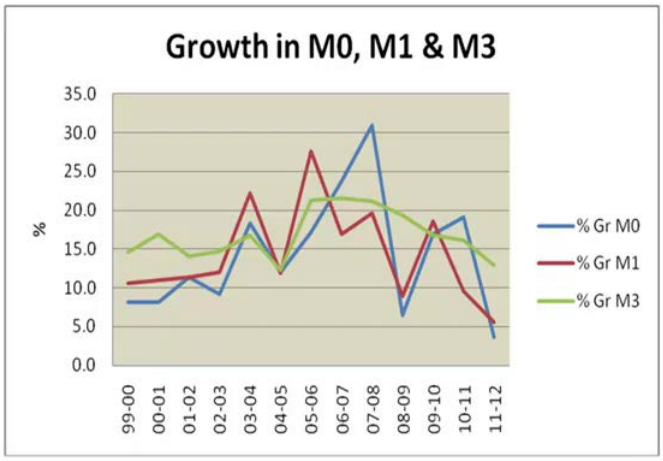

Figure II.2

You can see the green line M 3 and where is M 1 the pink line - huge difference, when we tried to find out why is the difference, then we went into red is a growth rate. M 3 is more stable than M 1 or monetary base monetary base absorbs the shocks immediately any shock in the economy either from the foreign sector, export, import etcetera capital inflows or within the economy. Thus like a part of the body which absorbs the shock right away in car, you have shock absorbers; when it hits a pit or it hits a bump, there is a jerk and good cars have good shock absorbers which absorbs the shock. So, you inside do not feel that much. What you see here is that M 1 and M naught are very close to each other the previous diagram; M naught pink line and the blue line very close to each other. So, they are very intimately related, I was talking about two friends going for a walk in the evening very closely related.

So, what is happening any shock in M naught is immediately probably seen also in M 1 because the following diagram you can clearly see the growth rate of the blue line and the growth rate of the red line are two kind of similar. And the green has its own pattern like you know the two young fellows jumping up and down the road when they walk and there is an elderly person who has a very smooth kind of even speed cannot jump up and down, aged you know whatever. It has its own path there is one big hump, a jump they are spike, but then it is gradually tapering off you can see the line is coming down. So, the growth rate is very steady. So, M 3 does not absorb much of the shock is very protected. So, M 3 has its own characteristics it has its own path to follow. You notice

that here and you noticed the earlier one M 3 is way ahead also in terms of the line slope way ahead very different from M naught and M 1. So, the question is why is it so?

The explanation is in terms of on the multipliers. So, I need to get into multipliers. So, what I did after that was a series of lines to talk about the percentage shares within these what are important in M naught what are important in M 1, what are important and how important are they. Are they changing is their changing importance not much a little bit of bifurcation now with currency and demand deposits here in M 1. They were very close to each other for a while they came down to each other and there is a bifurcation coming again. So, people have a more habit of holding currency which is happens in kind of a situation in India we have where you have stagnation which is recession and inflation people do not get much return by putting money in the bank. So, they instead keep on buying things also, because real goods carry more value and inflation prices are going to go up tomorrow. So, anybody wanting to buy a car rather not wait buy the car, because unnecessarily twenty thousand more they have to pay only two or three months later what is the point.

So, these kinds of things and government taxes go up in recession, government also does not have money keep on taxing it is a very contradictory kind of a system situation that arise. Economy not doing well government also raises taxes you know government wants to spend more, where will the government get money you ask want government to spend more on welfare schemes, unemployment etcetera, because people are laid off and government does not have money. So, government keep on taxing more who can pay the taxes fixed income group gets taxed, because they cannot avoid the tax. Company business [FL] tax avoids [FL] it is a catch 22 situation. All sorts of unpleasant things start happening in the economy in the macro economy, which you probably know from the macro economics course.

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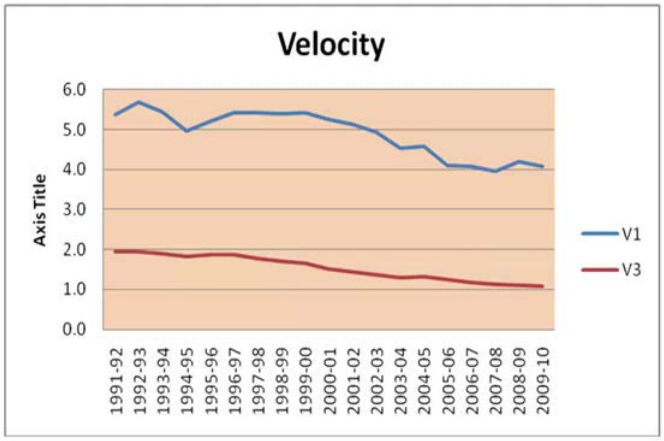

Figure II.6

Next M 3 very different diagram component [FL] dominate [FL], this is one feature of M 3 also. Another feature of M 3 time deposits dominate and currency demand deposits are way down there is not much of a change they are very close to each other [FL]. Then the velocity I was talking about of course, v three is the one to look for the lower line - the red line. What do you expect the velocity to happen in a modern world, where there is more smart money, card money etcetera, credit cards, charge cards what you call them the smart cards. You know all sorts of automatic teller machines of course, increases the velocity, but you have all sorts of cards where checking systems are better you make payments through cheque.

So, one would expect I think Irving fishers hypothesis to be still true that technological developments and institutional changes will alter velocity of money and that too in the long run. You can see the line is not dramatically reducing, line is definitely steadily reducing, going down. This steady down down swing downhill not a dramatic fall at all is clearly supporting Irving fishers hypothesis that the technological improvements and institutional changes occur only slowly in an economy. And over a period of how many years I have 20 year period. Over a 20-year periods, the number has come down from two to one - velocity of money. So, now, simple arithmetical calculation what is happening today in economy the nominal G D P is nearly matching the nominal money supply M 3 or something like that. That velocity is saying nominal G D P at current prices more or less equal to money supply. Velocity is what M V is equal to p y if you do

roughly you use that equation then this is the story today in India, it was double. So, when nominal G D P was 10, money supply was 5, because velocity was two. Now nominal G D P 10 also means money supply 10 - dramatic change, but it happened over a period of 20-years, very important data here. So, one need not write Ph. D thesis or do research work on velocity any more. It is not an important number any more, if the number was high people would have thought about why is it so. Low number does not make create much interest, is that clear?

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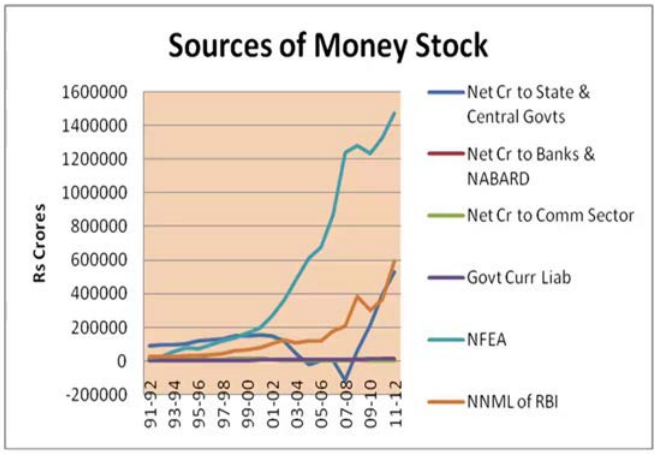

Figure II.7

So, now let us get into these other things then I will get into the money multiplier. I was talking about sources of money stock; money stock which is the monetary base one need to find out what are the sources of stocks, what creates it. You have water in the room, you want to know from where the water has come it may come from a seepage; that means, rainfall; it may come from a leaking tap somewhere it may come from a mischief somebody put water here came with a bucket room was open and put water here. So, source of money stock is where it is money coming from RBI wants to know central government central bank always wants to know because those are the places they need to study, where is it coming from. You can see that a blue line dominates here.

You clearly see one line dominating and it is going up and up and there is some orange line and a deeper blue line underneath. What are the three lines? So, they are three items which contribute to money stock in India today, and for quite a while, you see other lines

are flat on the x axis everybody lying on bed, dormitory [FL] everybody at sleep peace with himself itself. This light blue line is NFEA. NFEA is net foreign exchange assets that is the source of money supply, money stock change not money supply that is called monitory base change. The foreign exchange earnings that Indian exporters and Indian capital market receives through portfolio investment and foreign direct investment and foreign exchange earnings of exporters contributing to rising monetary base.

You clearly see that this is absolute numbers here, not percentage. Then you see an orange line, the orange line is what, the orange line is I need not talk about orange line I will talk about that later. Then another blue line, the dark blue line what is the dark blue line - net credit to state and central governments. The top item and the second last item, these two items are dominating here; note, two sources of monetary base very important. Net credit to state and central government is this line this line is erratic, it has been negative also and as going up when is it going up after seven eight, is it going up after seven eight? Steadily, what happened in 8 August recession set in in the Western World. So, the financial year seven eight; that means, 7 April to 8 March. It was way down there, but then after that 8-9, 9-10, 10-11, 11-12 all going up. So, central bank, state government and central government are borrowing from RBI - number one point; typical scene in a recession government budget is in deficit tax revenues are falling, economies income is falling and government has to depend upon borrowing to fund its expenditures typical scene, it is nothing unusual.

And you can clearly see that hypothesis holds with this recession business going on. It was negative why negative means government was returning money to RBI what it borrowed in the past – net. It is a net variable, net I borrow I return. What is the number if it is minus means I am returning more than I am borrowing from RBI, that is a minus number. Returning means paying off debts it was negative. Now it has been going up and up; this is one line. Another one very interestingly recession or no recession there is after eight, a down a little bit. Clearly there is a break in the system, it was moving in a direction suddenly I changed my mind I go somewhere else, and then follow another path, and after that it is been going up again. Very interesting despite recession net foreign exchange earnings are going up in India. So, there is foreign direct investment coming in foreign the portfolio investment is coming, share market [FL] there is export earning still going in India. Foreign assets plus there is one more thing probably I do not

know whether it is reflected here RBI invests heavily with its surpluses in the international market foreign securities [FL] to make money.

[FL], China you know where it invests a lot these days other than expansion of real investment, monetary investment, euro, American government bills, treasury bills, euro bills, china budget surplus central bank government [FL] etcetera, Chinese central central banks surpluses. They make money and if you buy a good governments securities, there is hardly any chance of a default, they would pay you interest. In a market kind of a situation there is a chance of losing money suppose there is a slump alright suddenly some stock markets crashed there is an uncertainty, but when you buy a government bill, government bills are more secured it is called next topic I will talk about they are called gilt edged securities. Gilt means zero risk hardly any risk. So, maybe that is another source of income for this RBI for net foreign exchange assets, they are going up.

And there is a orange line, I talked about that this is a minus number I want to show you that minus number here which is deducted to get the monetary base value. This is revaluation etcetera of assets that you already have at the time when dollar came six months back and I converted that into currency and gave that to you earned the dollar now you cannot use dollar in India so you give that dollar to me I give you the rupee to you. Now that dollar value because of depreciation has gone up does not mean the currency in India has gone up. But if you have to balance a balance sheet whether are assets and liabilities alright that is how you correct you deduct that value from your asset value, revaluation when dollar take place that dollar stock value [FL] meaning India [FL] currency [FL]. Because they are not exchanging today, they exchanged that in the past similarly gold etcetera. If international prices change my stock of gold value goes up overnight that does not mean the currency in India has also gone up you understand what I am saying. So, that orange line is significant.

So, sources of monetary stock there are two lines which are important right now. None of the other items are important net credit to banks and NABARD not important, they are not borrowing from RBI. Net credit to commercial sector is not important way down there flat. Government currency liability [FL], how much coins there I told you it is a fractional reserve system, we have one percentage, 1.2 percentage coins, the entire 98 percent more than 98 percent of our currency is in notes. So, government currency liability, how much will it be, not important. It does not change much either, are you

following me you got to follow me you got to enjoy this also, because you are really learning real economics here this is exactly the story of India today Indian money market. [FL]

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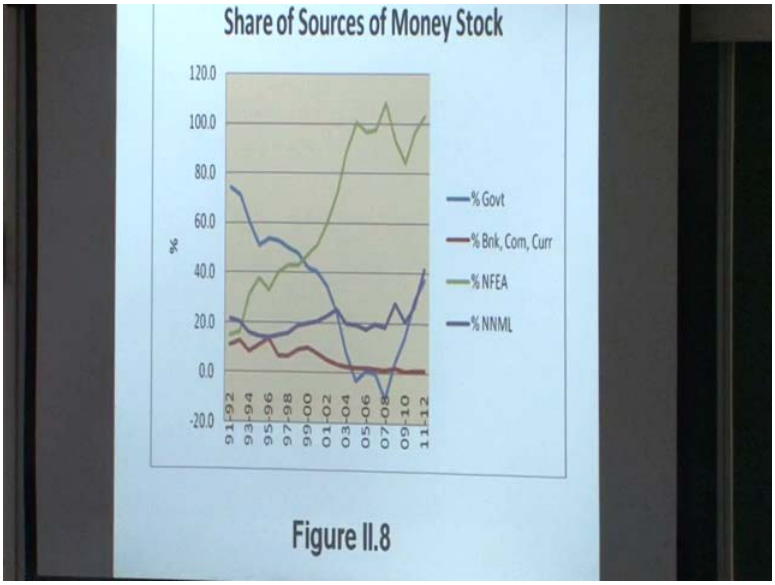

Next I wanted to talk about share of sources this is the percentage I have done. As I told you the green line is the NEFA, [FL] share of percentage [FL] and then the blue line what is the blue line government, I just told you source government is next important and lilac line is the that the orange line in the previous diagram is a net non monetary liabilities. [FL] recently non-monetary liabilities [FL] line you know why it is so, tell me, last two years it is been going up.

Student: (( ))

Professor: Exactly, revaluation [FL] dollar value RBI [FL] in terms of Indian currency. But they haven't pumped in Indian currency at all, it is just the rupee value of dollar has gone up because the rupee is depreciating. And you can clearly see the net non monetary liabilities are going up too, which you have to deduct, remember one minus item is there from M naught. Bunch of items added and one item is deducted, if you look at the formula I told you in class. And [FL] the rest of the items bank, commercial sector, government currency liability that orange line orange line percentage [FL] nearly zero today [FL] importance [FL].

So, one item and government borrowing are the sources of change in monetary base in India today, two items. If you look go back to seventies, eighties data, I wonder if you I wish you can do that, but I do not have that data I have not done that. You will see sources of monetary base in India, which item was dominating you know that NFEA line was a another line, NFEA was not there, zero, nearly zero [FL].

Student: (( ))

Professor: Government borrowing, and this guy here banks borrowing, commercial sector borrowing they were the two important lines. I can challenge you can get that data and plot them for ten years, seventies or sixties or even the eighties, you will see this NFEA line was not there at all to be seen. It was like one of these guys lying here, [FL], government, the blue line government borrowing and this other lines. Pattern has completely changed sources of monetary base changed or sources of monetary base completely changed the distribution. You can do a study if you wish you know I do not know if you want to our monetary bases changing sources, and therefore, the changing pattern of the Indian economy is clearly connected very well connected.

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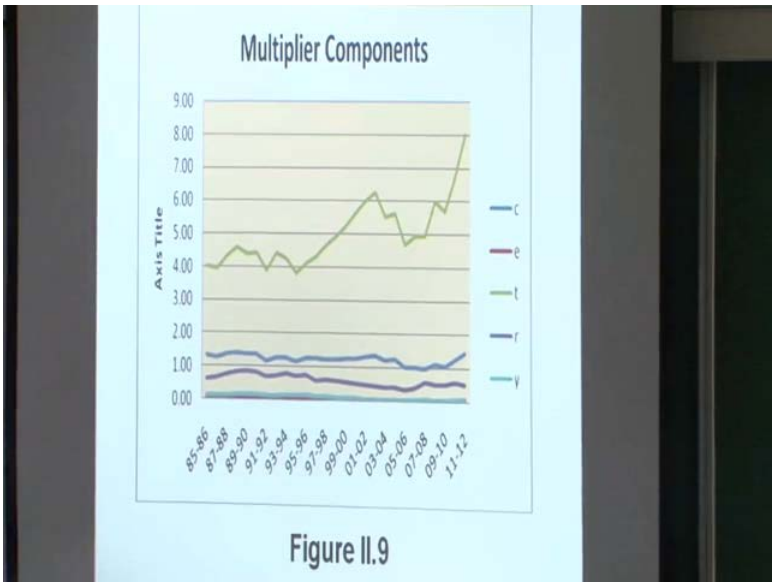

Next is multiplier [FL] final thing money multiplier. These are the components of multiplier [FL] small c, small e, small t, small r, small omega or gamma not omega gamma. Small c is currency demand deposit ratio [FL]; lilac is the r line which is a simple CRR only on demand deposits, this is the actual CRR which is very low as a

percentage term. So, there is this lilac line which is not very important in simple money multiplier is there. Gamma this one is in complex money multiplier, the blue line is important this is the currency demand deposit ratio. And one line here dominates, it is a very interesting, there are structural break he was steadily going up to a point early 21 first century, then it came down came down and then it is steadily rising. Even in recession, it is steadily going up that is what that also shows how Indian people respond or behave when it comes to savings for instance, what they do, they are not very smart with capital market at all share market investment [FL].

So, what they do, they look for kind of mutual fund kind of an investment, I have also done that a bank fixed deposits [FL], return safe. This time deposit business, this line dominating is clearly this also a feature of Indian citizens or savers. Demand deposit may be going down, currency to demand deposit ratio is not changing much may be a going up a little bit last two years, this is the last two years only 10-11, 11-12 much not much a little bit going up maybe. Picking up last two years recession has severed which I told you why people would like to hold currency, because they would like to spend and spend costs are also going up, it is like a company's profit function costs are going up buy goods are more expensive with inflation.

Food cost in front of my eyes from for hundred and thirty forty rupees, it has gone up to two hundred and thirty forty clearly hundred rupees jump in the last year and a half year food costs. [FL] Bill time order and they bring it over and they give me [FL], I could not believe the bill I am paying food costs for instance have gone up enormously. So, often on TV, when they talk about inflation in India today they do speak about a lot food inflation only. If you have a subset of food items and get their CPI values and calculate a subset of inflation not the aggregate inflation; only the food inflation, it is very high nearly twenty percent or something per annum food inflation.

Wholesale price index inflation is about 7, seven and a half or something right now. Food inflation is still very high which is a subset of items in that WPI group, they are all available the weightage WPI food items have you seen WPI breakdown wholesale price index India you have not seen. These are things you need to check out yourself. I can give you sources. What are the items in WPI and what is the weightage. Every item has a weight. So, there are food items, primary articles, there are electricity etcetera, fuel, there

are also manufactured and semi finished goods which interest produces various items are there in WPI, [FL]. This is a good measure of inflation of any country WPI.

What is the name of WPI in US or some other western countries? What is the name of WPI in western countries, they do not they do not have a WPI. We call in India wholesale price index. What it is called in western countries? [FL]

Student: GDP

Professor: GDP deflator is very different from WPI, it is there in every country, but WPI is not called WPI in other country.

Student: CPI

Professor: CPI is also another measure which is there in other country. What is WPI in other countries? What is the WPI?

Student: (( ))

Professor: Very good, wonderful it is called producers price index. If you read man q first chapter has it, they do not have something called WPI, it is our name; American's for instance call that producers price index, same thing, [FL] PPI. So, t small t is a very dominating factor. So, what you are expecting the partial derivatives that you have seen the multiplier, what you expect the multiplier values? what do you expect the multiplier value is going to be?

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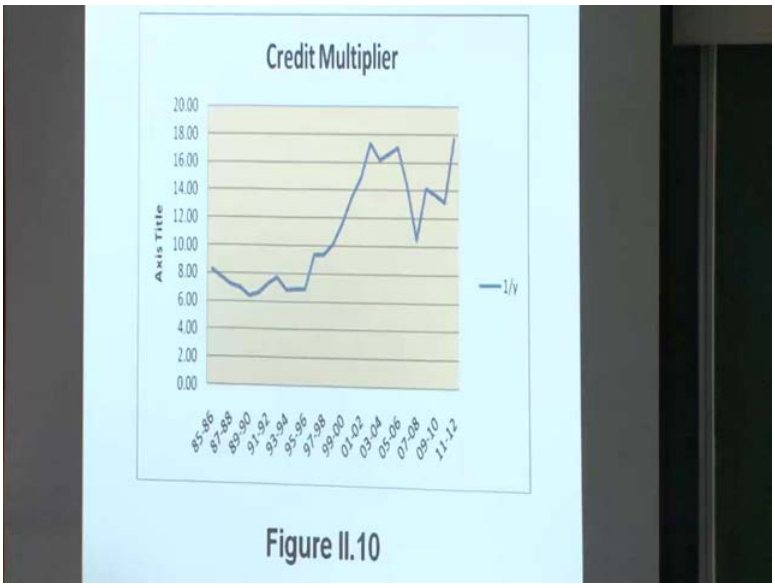

If t is so high, this is the simple credit multiplier one over r. It is a nonsense, one over gamma is just for fun, I have done credit multiplier. It is a very simplistic thing just to check it is not an important slide.

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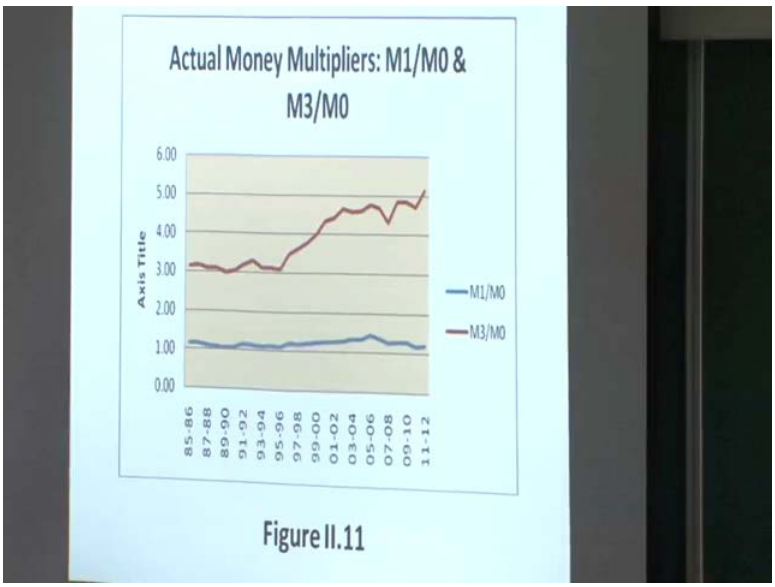

There you go, what do you notice here. Very distinctive, very significant a multiplier value remember not the absolute value of my M naught, a multiplier value if you look at the complex multiplier, it was flat down three till mid nineties. After mid nineties [FL], it has gone up from 3 to over 5 a multiplier. So, hundred crores of change in monetary base

now creates 500 crores of change in M 3 that is the M 3 or more than 500 crores. So, why is the M 3 line like that, very simple reason monetary base does not affect that much we have seen, is the multiplier itself which is which consists of behavioral parameters how Indians behave, Indians are behaving differently. After mid nineteen nineties, banks reserve ratio etcetera we need to check the data actual numbers may not be changed much may not have changed much the e value, the CRR value may not have changed much as percentage. But what has changed is how people in India keep time deposits and money in demand deposit accounts; t that t thing and you look at the multiplier here that is significant rise, you are going flat on a plane literally small humps [FL] there split [FL] dip [FL] first year of recession [FL] shock [FL] time deposits. Let us check the actual numbers, let us check the actual numbers, I have the data here tables. let us check the actual values when it changed topic two table.

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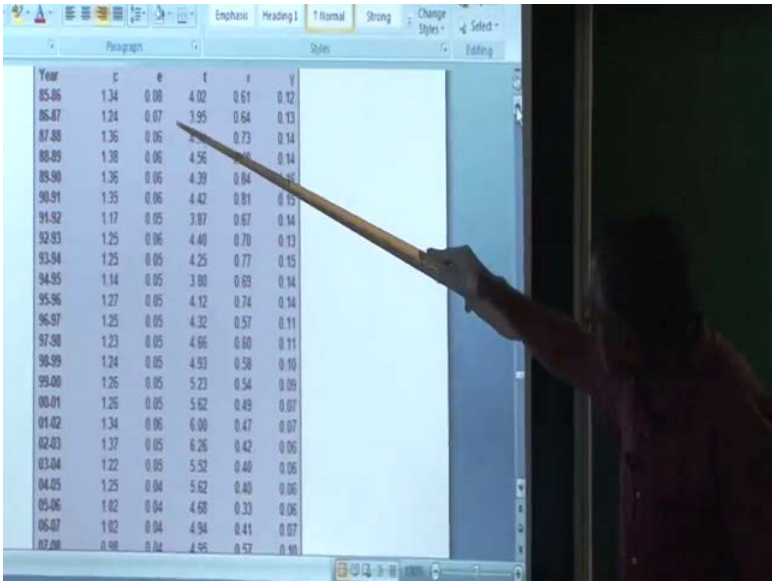

The first column is C, c e; e is very steady [FL] as percentage four. Seven eight [FL] four, c, e, t, r gamma r ignore [FL] gamma gamma percent high [FL] drop [FL] 06, 07 [FL]. Last few years, let us see the first column c, second column e, t and the last column gamma r - CRR or cash with banks deposits with RBI, this is what I have done banks deposits. Just no CRR banks deposits plus CRR. It is CRR plus. CRR plus cash bank cash [FL] RBI. [FL] c [FL] 1.22, 1.25, one zero, two zero, two seven eight may 98, [FL] 89 recession here; 1.13 [FL] recession [FL]. CE [FL] I told you this banks behavioral parameter would not change much, banking policies how much people withdraw as cash

the cash they are receiving these days so much that the percentage of cash they keep with themselves e as reserve cash is not going to change much.

Because when the total is changing so much, the same percentage is good enough for them to meet your and my requirements to put in the automatic teller machines as some precautionary money whatever they keep. [FL] 784.98 89 [FL] dip [FL] 899 10 [FL] 5.68. The second year 8 9 recession and 9 10 the second year of the recession, In fact people said when recession hit the western world India was hardly affected, nothing we felt here. The second year nine ten we started feeling it the inflation started going up if you check the data all this you will see that. So, the second year, there is a time deposit to demand deposit ratio change here, and then it has been going up again. So, people are more people have got used to the illness in the economy, they have gone back to the fix deposit habits, second year [FL]. And CRR [FL] 1.1 something 08, 0.06 which is nearly to 0.04. Now if you look at the standard deviation here how much it has changed over the last 20 years 20 -2 years which is the lowest standard deviation here, e banks then the CRR. This one you can ignore one this is the highest. So, the time deposit line which is the dominant line, time deposit to demand deposit ratio has the highest standard deviation also that people have changed over time that is very interesting.

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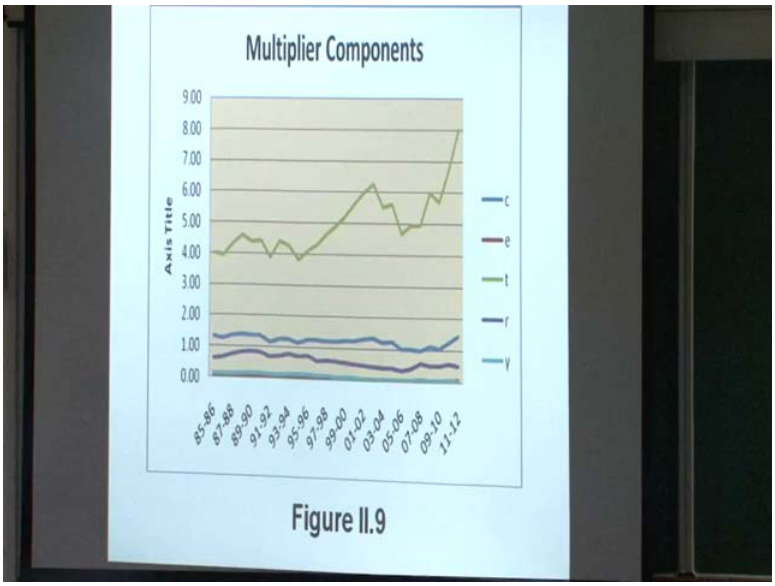

So, if you go back to that green line, it has fluctuated most. Let me check the green line in the previous diagram, is it true what it is saying the standard deviation is most. You

clearly see the green line has been responding for whatever reason in the economy how people are keeping money in savings accounts and how people are keeping money in fixed deposit account. It is definitely responding much more sensitive, it is dominant among all other parameters, but it is also having the highest fluctuations, standard deviation measures fluctuation, average value deviation measure [FL]. You take the average of the series and then the deviation from the average and then you normalize that with the number of observations or something. Standard measure of deviation, fluctuation, variance statistics main variance [FL], it is the standard most simple measure of variability. Whether [FL] fluctuate temperature how much it fluctuates you can always measure a variance. Standard deviation is doing that yes it is very clear, why is it so the standard deviation value is the highest one. You can see the green line [FL] variation compared to any other line it is very steady. So, this is the story of money supply not money market [FL] topic money market. [FL] is it alright all of you.