Money and Banking
Prof. Dr. Surajit Sinha
Department of Humanities and Social Science
Indian Institute of Technology, Kanpur

Lecture - 10

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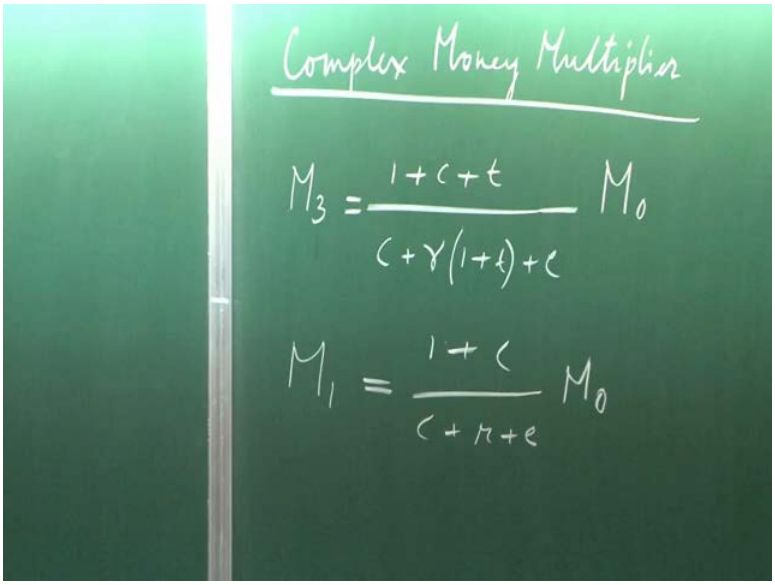

So, we will conclude this topic today except for the data part. What we found is the complex money multiplier - 1 plus C plus t divided by… So, if anybody asks you why does broad money change, why does broad money change in the economy. There are two reasons, monetary base is changing and or the complex money multiplier is changing, so broad money can change. Now if you look at the complex money multiplier, there are 1, 2, 3, 4 parameters which are important. Currency to demand ratio, demand deposit, currency to demand deposit ratios c over d; small c is c over d, currency to demand deposit ratio essentially depends upon people spending habits.

Suppose they receive more income, they can spend more then put money in demand deposit, they have sufficient demand deposit, the ratio can get altered. Then t, again peoples have it, how much they would like to put for current use this month, next month use, and how much they would like to put away into fix deposit accounts for future use - that is also people's decision. It can also depend upon the income; many other factors may be the state of the economy, income etcetera. So, these are the factors that will determine may be t.

Then governments decision is very important, government means central bank's monetary policy gamma, monetary policy this is CRR. So, if CRR changes then the complex money multiplier value will change, certain asparagus, keeping other things constant. Again broad money can change which in fact, central bank tries to do that they alter CRR in India for instance RBI does that. They control CRR to control broad money etcetera. And finally, there is a parameter which is not statistically very significant, it will see the numbers today e, e is banks cash holding. Banks cash holding is not a very large number.

Now what I am trying to tell you is there are various reasons for which M 3 changes. Now I do not know in the current literature, but in the past, there were a lot of interest in how M 3 changes and M 1 changes. Now if you go to countries like US they have something called narrow money, and they also have something called broad money which we call M 1 and M 3. These countries, there are various reasons for which some studies focused upon narrow money, some studies focused upon broad money usually it is a broad money which interest people most economist most.

Let me tell you a little bit about what I found probably (( )). These are the books and paper and peoples name whom I know. There is to be a noblariot, he is probably no longer alive at Chicago University Milton Freedman, Milton Freedman is used to be called the father of right wings economics, who believes in market systems, and no government intervention, classical. Use to be (( )) and his friends used to be called monetarists, I mention that I mention that in my macro course is the branch of classical macroeconomics called monetarist, who focus is on money supply. And the basic thing is that beside studying how money supply changes for what time, longer time period, shorter time period. The focus they also used to say that control money supply, because too much of money would create inflation it nothing else.

And they never believed in pension polices that government can do something good for economic. This is the classical mode and monetary monetarism is a branch of classical macro economics. And Milton Freed man and his somebody used to say his girl friend somebody say his wife, but what we call them professionally his colleague, and shores wrote a number of books; one of the famous books which may be in the library is a monetary history of the united states 1867 to 1960 - the data period monitory history of the united states.

So, they tried to analysis and prove the behavior of the macro economy over this hundred year period, nearly hundred year period using their belief that money supply plays the key role and whatever happen to the economy is the play of the free market capitalism. The political alliance, you know this free market capitalism is more align with the right way republicans and the democrats (( )) etcetera are more with the believe in free market etcetera, but they also believe in government role. Then one of the student become famous he lived a very short life Philip Kaegen from Chicago university, he wrote a book also called determines on effect of changes in the stock of money. Stock of money, money stock one say which variable M 1 or M 3, Namrutha?

Student: (( ))

M, louder, it so…

Student: (( ))

No. M 3. So, he wrote a book on M 3 and what Freedman etcetera, people were more interested in M 1 those days; their definition of M 1 which is difference slightly different from our definition of M 1, but similar. And Philip Kaegen was more into high powered money stock M 3; high powered money has many names M 3, money stock, broad money, broad money etcetera. No no sorry high powered money is different from M 3; high powered money is the base money - reserve money M naught, and the broad money is also called money stock M 3. So, they were not multiplier necessarily, they were looking into the behavior the change in the number of currency to money supply ratio currency into demand ratio [FL] currency to money supply ratio.

Here we have c small c, c over d currency to money supply ratio required reserved ratio gamma that variable, two periods they used to select. Business cycles, short run periods where economic going up and down business cycles that what you have learn in intermediate macro economics ISLA models etcetera, business cycle models and also long run - 10 years, 20 years, 30 years period you will study. Milton Freed man’s books was nearly hundred years data there, it goes the very long. So, they found that the multiplier is not really the variable in the responsible for the change in the money stock M 3, they found M naught change is the primary thing that was causing M 3 change.

However the currency to money stock etcetera, these small parameters like c etcetera became important over cycles short run period. Short run [FL] income [FL] c can increase like that, but long run period dominant factor determining the movement in M 3 in their studies was M naught the base monetary bases. And they also had in Kaegen currency to the money supply ratio as well as currency to deposit ratio may be total deposits. And he also found that it moves in the direction of national income over cycles, across cycles and it moves pro cyclically; pro cyclically means when the economy is going up income increasing, employment increasing, unemployment falling, consumer spending increasing c value are something near to c similar to c small c is increasing. Pro cyclical change, when it is going down its also going down, we need to check our c values over c values currency to demand deposit ratio.

So, different studies use different variables and they were more interest in to movement and study of this kind of parameters and influence of monetary base on M 3. I am not saying that you have to do that, I am saying this is what is being done is used to be done and I think our central bank etcetera still interested in these issues. It is not that this is an old issue they are still interested. So, if anybody interested in money multiplier, money supply process etcetera lot of data these days are available and the literature is also available gets back to nineteen sixties; it is not earlier and people like Ana Shrods Milton Friedman Philip Keegan, the Chicago school and some affiliated places, you know did a lot of work on that. The Keynesian polices are more a kind of demand management policy stabilization policy etcetera.

So, what I do now having told you about money, supply first topic I did not have any data; second topic I would like to show you some data, and I will send you some data files which will contain the numerical tables as well as the flex that I show you here. Right now I will not show you so much of the tables, I will show you the flex of the variables and but when I will send you word file in a couple of days time, you will have a then the the tables, numbers - actual numbers and also the flex.

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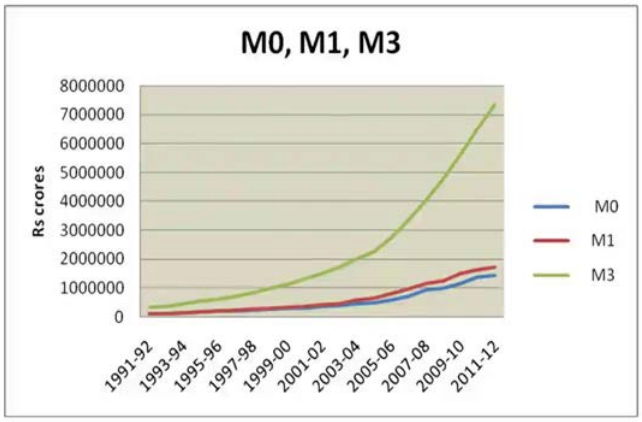

Figure II.1

So, let see what I have first M naught, M 1, M 3 monetary base M 1 M 3; notice the huge difference. Particularly since the mid nineties, it is starting picking up of late nineties, the green line shoots up like an aero plane, aero plane [FL] shoots up whereas M 1 and monitory base a slope close to each other. So, there is a big difference between M naught M 1 on the one hand M 3. So, M naught disturbances are very little or similar to M naught, so you can say M 1 and M naught moved similar to each other in India particularly last 20 years of so or may be 18 years or so.

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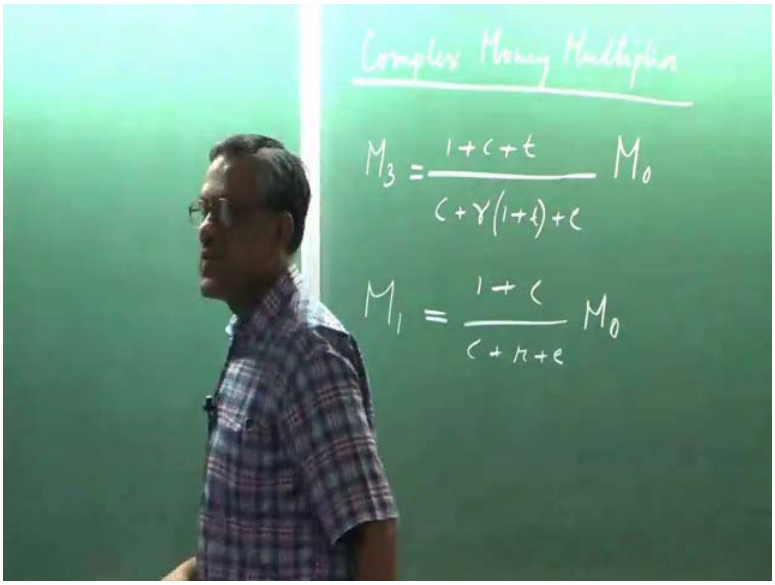

Monetary base and M 1 were very close to each other which means I am talking about that if you look at the multipliers M 1, what I had was if you can help me 1 plus c over, what is the multiplier I had 1 plus c over c plus r plus e r was a truncated reserved ratio, one plus c over c plus r plus e. Now this multiplier is very weak had no influence on M 1 you can clearly see from the two lines. You do not want to go to any analysis; look at the two lines they are like [FL] hill multiplier [FL]. Effect monetary base M naught and M 1 are very close to each other, they have a very close relationship very intimate relationship. M 3 [FL], M naught [FL] relationship [FL] that multiplier is very important in India over time. Just the opposite to an Snow and Milton Freedman, what they were saying happened in hundred year period in the US or in a 16 research on this kind of an issues.

Today in India, broad money multiplier as a much stronger influence then the monetary base, this fellow here which I called small m 2 has a much stronger influence to M 3 then this. So, what you are saying that the behavioral parameters c, t, and off course governments central banks CRR, they determine e is a very small number I will show you, they determine the strength of the multiplier, strength of M 3, the movement of M 3. [FL].

Did you watch Olympic games, some competitors were so good, they were far ahead of the rest far, [FL] ahead unbelievable how much of a distance, there was from the first position in the two second position. Some were very close like hundred the meters spent etcetera that use and bold stuff very close, but some of them were my goodness. Marathon [FL] difference. This M 3 fellow here you can see is which you has an exponential curve you know is an exponential function exploding, [FL] multiplier [FL].

Now you tell me the reason, let us see your intuition why the M 3 complex multiplayer is so strong and increasing. The monetary base has a very little influence on M 3.

Student: (( ))

Professor: Very good, wonderful t small multiplier and large multiplier [FL] important reserved [FL] would r gamma factor t the time deposit in India to demand deposit ratio now this I cannot just explain like this. People have more income simple people have more income where to do what to do with the Indian habits they do not put the money in the stock market which broad. They do they have look for a safe zone park the money

and they are putting in the fix deposit. So, banks are flush with the funds literally banks are flooded with money deposit that time deposit where the time deposit be kept. These are all banks time deposits, fixed deposit accounts, there is a fantastic thing in India. We are very conservative we do not invest in stock market etcetera, and we just park the money excess income you understood what I am saying this is what you see.

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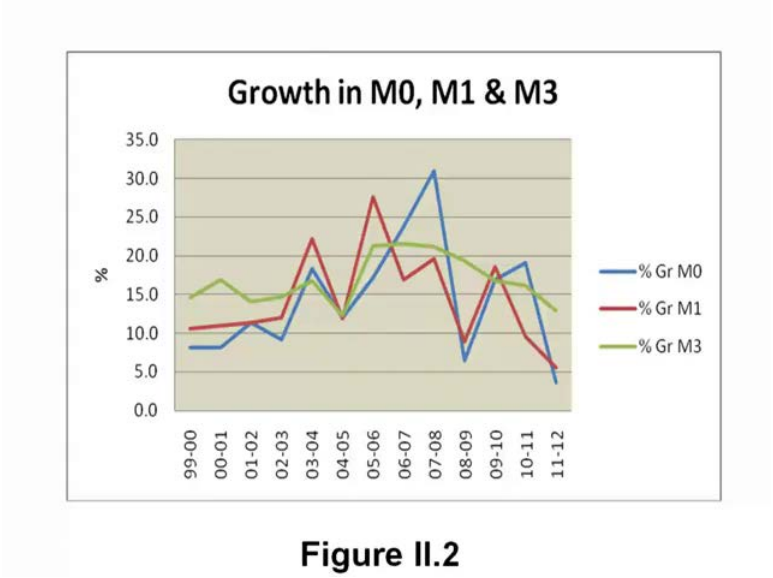

Figure II.2

Next the growth rates, and I will see standard deviation etcetera. You can clearly see the blue line growth rate is the most erratic. Why, off course as I told you if anything hits the economy like an earth quake, shocks, it will first hit the monetary base. Now if the super structure is very strong you would not feel it much, but the shock is absorbed external shocks, internal shocks by the monetary base. So, you can see clearly the blue lines fluctuations are much wider, then comes the red line which is the M 1 because blue and red are close to each other. I told you the previous diagram and the green [FL] earth quake flood the structural around 2005 growth rate is falling recession growth rate is falling, but it is much stable stander deviation if you calculate, the differences in the variations the number will be much smaller for M 3 [FL] V M naught and M 1.

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Table II.3
Growth in M0, M1 and M3 (%)

Year	M0	M1	M3
99-00	8.2	10.6	14.6
00-01	8.1	11.0	16.8
01-02	11.4	11.4	14.1
02-03	9.2	12.0	14.7
03-04	18.3	22.2	16.7
04-05	12.1	11.9	12.3
05-06	17.2	27.6	21.2
06-07	23.7	16.9	21.5
07-08	30.9	19.6	21.2
08-09	6.4	9.0	19.3
09-10	17.0	18.6	16.8
10-11	19.1	9.6	16.2
11-12	3.7	5.6	12.9
Std Dev	7.7	6.2	3.2

Now let me see M naught [FL] standard deviation 7.7; M 1 standard deviation 6.2, and M 3 standard deviation is half 3.2. [FL] Much stable curve M 3, exponential growth I exponential going up, but the growth across years over years is much more stable; standard deviation 3.2, a stander deviation [FL] M 1 may be [FL] nearly double, [FL] 6.4 6.2. So, this is what you expect to happen.

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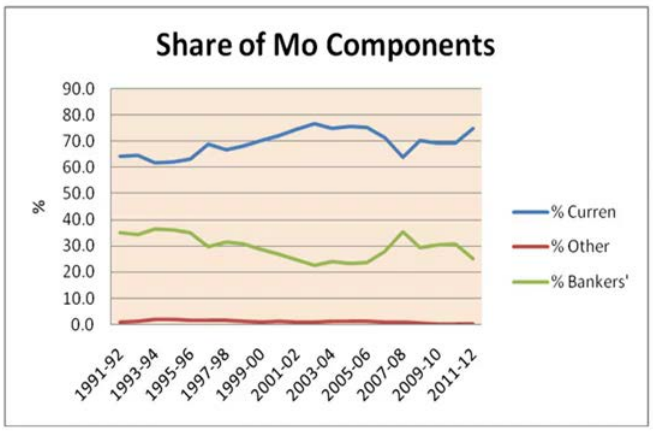

Figure II.3

Next is share of M naught components, M naught [FL] other deposits bankers deposits with RBI and currency circulation, [FL]. Currency in circulation, you can see last few

years currency circulation is around above 70 percent [FL] 70 percent above 70 percent; that means, 30 percent [FL] bankers deposits, because other deposits are very little all the deposit [FL] 1991, [FL] 93, 2009, 10, 7, 8, 11, 12 [FL] flat. I told you other deposit [FL] number. So, percentage of currency and bankers roughly 70 30 revision; roughly 30 70 revision; at mid early 2000 new million early [FL] 80 [FL], 75, 70 more than 70 percent [FL] a below 30 percent [FL].

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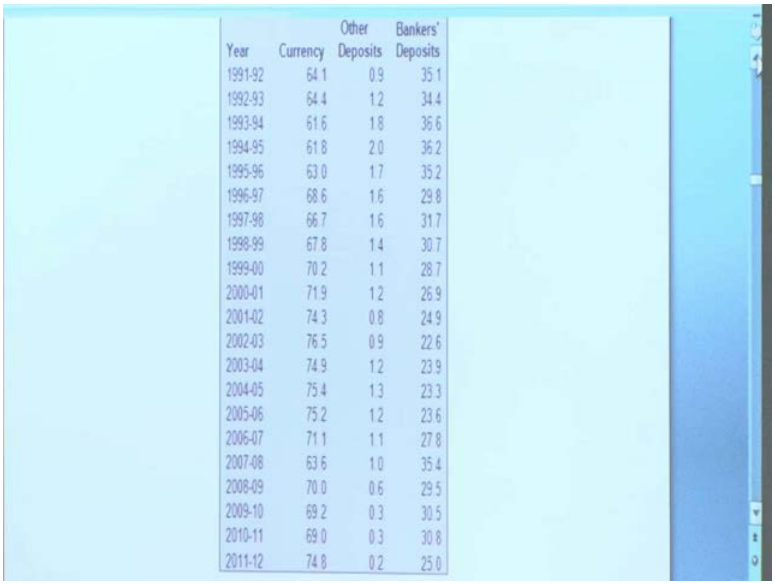

Year	Currency	Other Deposits	Bankers' Deposits
1991-92	64.1	0.9	35.1
1992-93	64.4	1.2	34.4
1993-94	61.6	1.8	36.6
1994-95	61.8	2.0	36.2
1995-96	63.0	1.7	35.2
1996-97	68.6	1.6	29.8
1997-98	66.7	1.6	31.7
1998-99	67.8	1.4	30.7
1999-00	70.2	1.1	28.7
2000-01	71.9	1.2	26.9
2001-02	74.3	0.8	24.9
2002-03	76.5	0.9	22.6
2003-04	74.9	1.2	23.9
2004-05	75.4	1.3	23.3
2005-06	75.2	1.2	23.6
2006-07	71.1	1.1	27.8
2007-08	63.6	1.0	35.4
2008-09	70.0	0.6	29.5
2009-10	69.2	0.3	30.5
2010-11	69.0	0.3	30.8
2011-12	74.8	0.2	25.0

Other deposits [FL] share [FL] percentage. One percent [FL] mid nineties and late 90s may 1.4, 1.6, 1.7 [FL] 1995, 96, 1.7, [FL] 0.3, 0.2 other deposit; [FL] insignificant is less then one percent that is why I was computing the multiplies algebraically. I said ignore them other deposit are very statistically numerically insignificant number. It is really need not have to worry about them the multiply unnecessary will became complex with a variable which does not have any numerical importance in India. So, why consider them and you can see as I told you 30 and roughly 30 [FL] last year 11, 12 - 74; that means, people are holding more currency than bankers deposit.

People currency ratio is going up. Why would people hold the currency, because this inflation etcetera may be creating this. [FL] so people hold more currency, we will find that out currency deposit ratio soon. You can see clearly the currency share in monetary basis has gone up, the currency share has gone up from it was 75, 74 came down to 70, 69; 2011, 2012 [FL] 74.8 means 75 percent. [FL] It fluctuating around 70, and bankers

deposits [FL] because banker deposit banker deposit are created after deposit they receive from us. If people decide to hold more currency what they putting relative terms less in deposits in accounts and banks keep deposits out of that with RBI. So, naturally there share would go down. So, one is connected with the other if one goes up other one goes down [FL] everybody following? Great.

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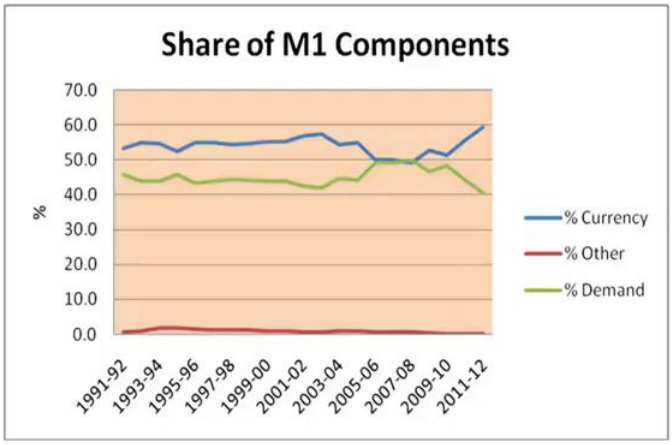

Figure II.4

Now, so this is very important study we are doing; study of Indian monetary system. [FL] share of M 1, [FL] M naught, M 1, [FL] instrument, [FL]. Off course other deposit [FL]. Demand deposits and currency with people with the public variable. [FL] 40 mid may [FL] mid may, 90 percent 55 and 45 nearly 100. [FL] nearly 100 [FL] mid last decade 2005, 06 [FL] I do not know why it happened. Demand deposit currency deposit are balanced 50-50 percent, 50 [FL] 50 [FL] which I was trying to tell you inflation and recession. [FL] economy inflation recession [FL] stagflation currency [FL]. You rather spend it and back goods because the prices are going to go up further tomorrow and also with inflation price is higher.

So, you are keeping less money in bank and banks are also not offering much interest rate. If inflation is high real returns is having fishers equation less; if real return is less why put money in the bank put it in goods buy things or put it elsewhere. So, currency holding has gone up may be inflation you know things cost more, so you need more cash I have seen that I notice myself when I go and withdraw money cash from the bank, the

cheque amounts I write, and how frequently I visit I clearly notice. So, the expenses at home my home is going up definitely if I look at up at my pass book it clearly says since when I have increased or kind of a permanently my monthly expenses clearly a cheque amounts I withdraw I clearly notice, how frequently and how much I withdraw.

So, this is exactly what is happening [FL], recession [FL] inflation which we call stagflation, stagflation [FL]. [FL] time Indian economy NDA government UPA [FL] 50 percent 50 percent [FL] share recession 2008 august [FL] world recession India [FL] 60 percent [FL] 40 percent both percentage points in lakhs of crores of money is huge and ten percentage point difference is massive difference. You are talking about money supply, remember may be narrow money lakhs of crores, I will go show you I will give you the data table. So, one percentage change there is huge number, I mean if they gift you one percentage of change in money supply, you will be very happy may be you will stop coming to IIT Kanpur studying go and buy a big house and stay there, rest of your life. Ten-percentage point difference within three years, ten-percentage point can you believe that massive change. [FL]

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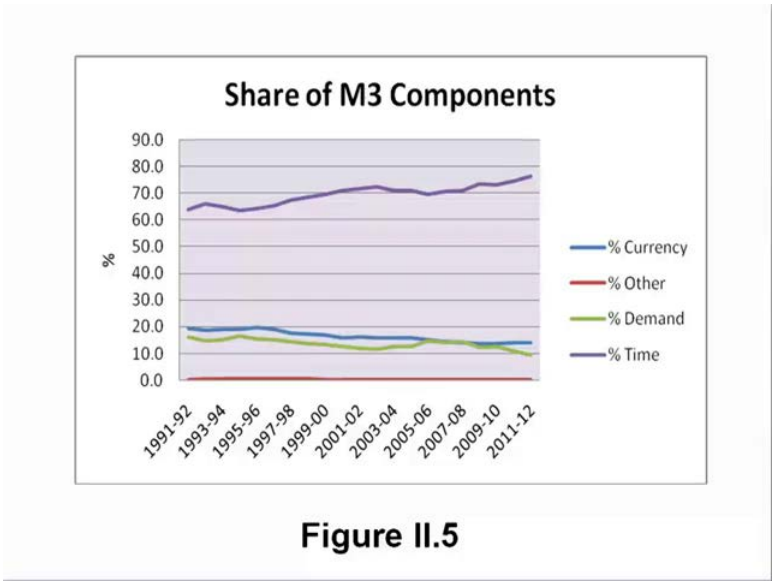

Figure II.5

Next [FL] diagram currency and demand deposits [FL] time deposit [FL]. So, if other deposits are in negligible, currency and demand deposits again similar they are very similar [FL] sharp [FL]. They were similar close to each other nearly 12, 15 percent and then now currency is taking up demand deposits are falling, but time deposit [FL] very

interesting. Recession or no recession in India time deposits, this is this I really cannot explain entire thing right now. You have to think, why the time deposits percentage share in M 3, did not change in recession or inflation. People probably think that there the return is still good on fix deposit accounts, but there is tussle going on between demand deposits and current spending c - cash holding. As a matter of fact this has a downward trend minor down ward trend negative slope [FL] the blue and green line here, if you draw a trend line here, it has a slightly downward slope not zero degree, minus degree [FL]. And here if you draw a trend line is clearly a plus slope [FL] may be 15 degree angle 10, 12, 15 degree angle [FL], nothing. And this one may be 2 degree, 3 degree angle [FL] trend is not parallel not zero degree if you draw a line straight line which is called a trend line.

It is clearly saying that so the three diagrams in terms of their component share are completely different. Go back to the three diagram M 1, M naught [FL] map [FL] geographical feature outline M 1 [FL] and M 3 [FL] completely different, 3, 2 aggregates and one is called monetary base their composition. Similar items are there, but they are very different. So, as you said time deposit t must be playing havoc, because that is the most significant parameter in the complex money multiplier, it is absolutely correct because you can see the time deposits here. Any question on this? When I was a student never has a access to data, and I never saw the lines we knew about M 1, M 2, M 3, but now it is wonderful to know what is going on and this is all from RBI site, I got the data all from RBI.

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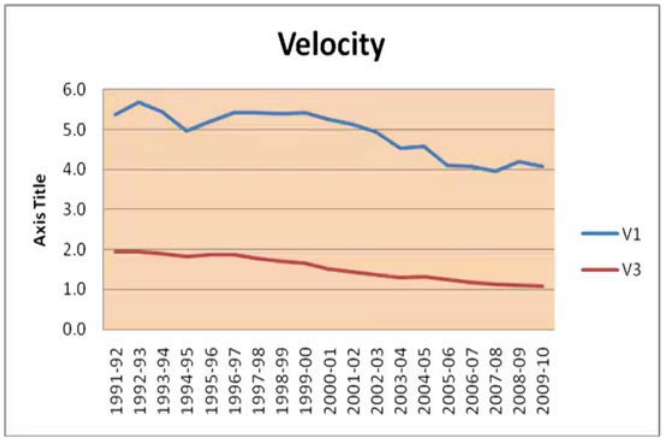

Figure II.6

The next is velocity; this is very interesting. I computed two velocities with narrow money one and with broad money. And you clearly see that the velocity of circulation turns out to be narrow money had velocity is higher number what is velocity nominal income of nominal GDP divided by monetary aggregate. So, if monetary aggregates are smaller than narrow money, naturally the ratio value would be higher. And if you take M 3 much bigger number with time deposit then there is line is down. So, the velocity complex multiplier V 3 velocity is here, and V 1 is there, but one thing is very clear in this two particularly note V 3. What is this line doing? It has came down significantly from near two to one, over a twenty year period roughly 20, 22 year period. It has definitely come down. [FL]

What does it mean? If velocity coming down, what is happening which hypothesis is correct, Irvin fisher or the Cambridge equation. The Cambridge economist who said short run velocity may fluctuate, may also fluctuate long run yes it will change and Irvin fisher was saying institutional find factors and technological improvements which change velocity in the long run. So, if you consider that to be a long run period is definitely providing support to Irvin fisher, who wrote about determinates of velocity around 19, 13, 20 is still valid. Why, what technological improvement and institutional factors that have change in last 20, 22 years in India.

Student: Electronic money.

Professor: Yes, electronic money - automatic teller machines, payment through cheques cash use is going down velocity of circulation is going down. We will need not have to carry cash, they can carry a card make the payment come back home. The card company will be approached by the seller to collect the money on their behalf and bank just text the money out from one account push it another money is not coming out of bank cash. So, Irvin fisher imagine the inside the thinking hardly cards existed those days, even in the western world forget about electronic money internet [FL], predictions were absolutely correct what determines velocity seems to be, seems to me.

Now you can think about any author. So, clearly the velocity of money is falling in India, I do not know it will be interesting to know what the velocity of money is in other countries, fantastic what the numbers are maybe less than one, I think. Because there are more modern economies, more payments with cards the number is probably very close to 0 or 1. The velocity is going down which also says something very interesting, velocity is going down then the ratio with a the ratio nominal GNP or GDP, divided GDP divided by money supply if the economies are growing then the money supply is coming closer to the nominal G D P that is also its is saying. So, there is a lot of money supply increase in these countries including India which is true M 3 [FL].

A huge amount of money supply increase, because it proves that point that velocity is coming down. Velocity is the ratio and then the denominator is also picking up catching up with the numerator value, the velocity cannot decline. Lot of money supply increase is also there in these modern economies, it is like cross checking that you solved the solution lets cross check from some other site whether you arrive at that number or not or what the reasons are. So, there is a lot of thinking one need to do why is money supply going up so much in a country like India, which is getting proved here that the velocity of circulation of money is going down. One thing institutional factors form the direct determinants of velocity; another one may be an indirect influence that the money supply is going down going up so much and catching up with the nominal value of GDP, whether velocity nature is less. Why, the factors determining that is very different set of reasons that you will come up with compared to M 1 (( )) explanation of velocity going down, institutional factors and technological improvements, clear?