Macroeconomic Theory and Stabilization Policy
Prof. Surjit Sinha
Department of Humanities and Social Sciences
Indian Institute of Technology, Kanpur

Lecture – 22

Under flexible exchange rate system which I did first, I drew only one diagram d Y d g. I did not draw the d Y d M, I thought I should draw that. The other two diagrams are under fixed rate system we can draw two, three diagrams; one which are relevant, d Y d g, d Y d M, and d Y d e, and the fixed exchange rate system when devaluation occurs. So, I will draw the d Y d M under flexible exchange rate system. That is the first diagram that I need to draw.

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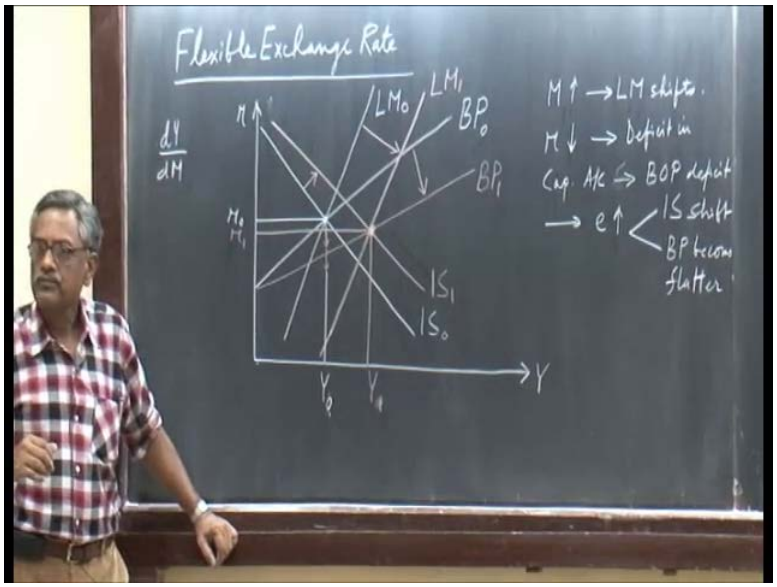

So flexible exchange rate I am going to draw the d Y d M diagram. You know the multiplier, you have seen the algebraic expression I need to draw that. What happens is under d Y d M, money supply increases it is a fixed price model. So, real money supply also increases l n shifts where does L M goes L M shifts to the right. This is L M. So, when money supply increases, L M shifts. Now, you can see one thing given our usual assumptions in these kind of a model, what we usually assume is, there are 2 adjustment variables. If you remember the stability condition and stuff we did, one whenever this is disequilibrium, the rate of interest will adjust if the disequilibrium is in the money market.

Y would adjust whenever there is a disequilibrium in the goods market. You remember that Y dot R dot equations. So, as money supplies increases there is a disequilibrium in the money market because the L M equation is M over P P not, P is fixed is equal to h Y plus l r. So, if M increases the left hand side is now more is greater than the right hand side value. Now, when money supply increases, when supply is more than demand this is generally true in economics, it is also true for the money market. The rate of interest or the prices fall, the rate of interest is the price in the money market price of money you can call that the price of money. So, the rate of interest would fall alright.

So, the rate of interest starts dropping. The time period we are not concerned with the rate of interest starts dropping. When the rate of interest starts dropping, what would happen is capital would flow out of the country because the capital account surplus in the balance of payment equation is lamda into r minus r f, r f is constant. So, when the rate of interest is falling it is more profitable for investors this speculators, to put money in the foreign banks as opposed to the domestic banks.

So, the money would flow out there would be an outflow of capital. Capital is money capital outflow of money capital from the country, towards other countries where the rate of interest is higher. So, there would be a capital account deficit, given other variables constant capital account deficit would create a balance of payment deficit because you are underneath the B P curve all region is deficit region. Above the B P curve all regions are surplus region in the balance of payment. So, there will be a deficit in the balance of payment.

This deficit in the balance of payment, all would fall and there will be a deficit in capital account surplus of capital account needing to a BOP deficit, given other things constant. Given BOP deficit in a flexible exchange rate system, you know when a deficit is created that is e value is going up. When there is a foreign exchange market, supply of foreign exchange and demands for foreign exchange I drew, the supply curve of foreign exchange and the demand for foreign exchange. So, when there is a supply of foreign exchange is now coming down because money is flowing out, e value would go up because the supply of foreign exchange value shifts backwards.

The e value would start going up. So, this would create an upward pressure on e value which is depreciation of the exchange rate when exchange rate depreciates. You know

couple of things happen immediately the B P line and the I S line will get affected, how will they get affected. Well as e increases things happen, one the exports are now cheaper in the world market. So, exports are expected to go up, imports are expected to come down. So, I S curve will shift to the right, I S will shift rightwards.

Also the B P line which is M over lamda the slope the M value falls. So, the B P line becomes flatter. So, two things happen therefore, as e changes the B P line also becomes flatter. The B P line becomes flatter. So, the B P line becomes flatter and I S shifts out. So, let us say the B P line becomes flatter over time and the I S shifts out. Finally, also I S will become flatter because M value falls.

So, I S shifts out and because of exports and also the M value would increase. So, what you have I S will become flatter and will shift out. So, you will have I S 1 and a new equilibrium point will be reached on a new I S, new B P and new L M. Where is the L M, there is the L M, the new L M curve.

So, initially L M shifts, then I S shifts out and becomes flatter and B P also becomes flatter. So, a new equilibrium point is reached with a higher output level, call that Y not and an output level initially you had which is Y 1, sorry this will be Y 1 this will be Y not. Rate of interest it looks like the rate of interest will fall. This was r naught and the new rate of interest will be r 1.

So, this is the d Y d M multiplier, under flexible exchange rate system. Step by step I have tried to explain what are the series of sequences of changes, that will take place. Find out if this is or not this diagram. This is just the diagrammatic explanation of d Y d M multiplier. Now, you can go into lamda going to 0 lamda going to infinity, various slopes of B P line will come.

Therefore, the same diagram you have different results coming, but the diagram is basically the same, except B P line will become flat if lamda goes to infinity. B P line will become vertical if lamda goes to 0 because the slope of B P is M over lamda, this is what you have. That d Y d M multiplier under flexible exchange rate system d Y d M multiplier algebra, you have seen done with the diagram. Now, we need not talk about any other diagram here. We do not require anymore diagrams under flexible exchange rate system d Y d G we have done already d Y dm I have done today. So, I can now go to the fixed exchange rate system, if this is alright.

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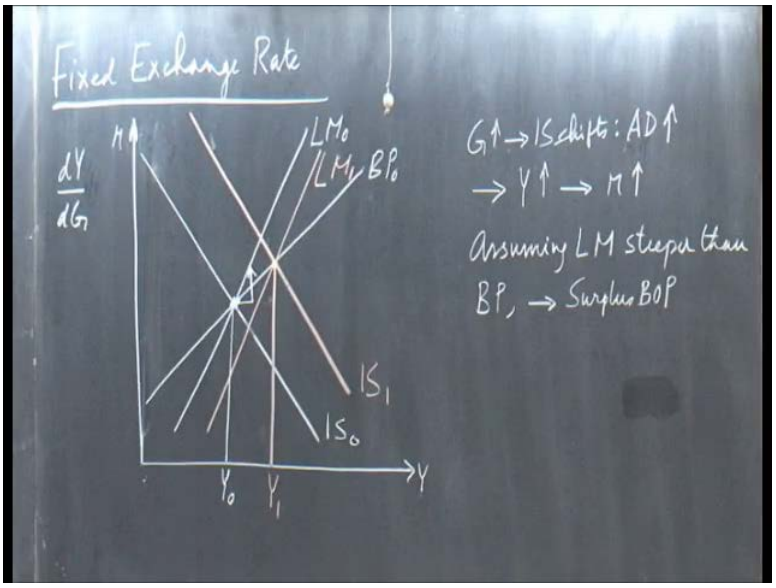

Now, under fixed exchange rate system let us talk about d Y d G first then d Y d M. Then we can talk about evaluation d Y d e that multiplier is also there. So, fixed exchange rate system. Under fixed exchange rate let us talk about d Y d G first. So, what happens here, is that the initial situation is the same as you have there. The initial situation is the same I S B P and L M all are there initial point is here.

Now, d Y d G first as G changes, as G increases I S shifts. Let us draw a new I S curve first I S shifts. Say I S shifts to here I S 1. As soon as that happens, the G changes what happens is the following, as demand increases I S shifts inclined aggregate demand has gone up which means output would start increasing. As soon as the output starts increasing, say output increase a little bit you are off the L M curve also you are off the L M curve. As soon as you are off the L M curve, this would give rise to r increase to clear the money market.

So, r would increase to clear the money market, r has increased to clear the money market. When r increases at the intersecting point you start, r increases to clear the money market it will be above the B P line it creates a surplus, as r increases assuming that the L M is steeper than B P, it creates a surplus. Assuming L M steeper than B P it creates a surplus BOP because capital flows into the economy foreign interest rate is constant. Our interest rate has gone up capital flows into our country, people are attracted to our banks. When people are attracted of outside they put in money into our banks in

our stock markets where prices are down stock prices, which is an inverse relation between rate of interest and stock prices.

So, rate of interest increase means stock price is down its cheaper like the way we get attracted to buy goods which are cheaper, when prices go down. Same thing shares also will be buy when they are cheaper. So, rate of interest increases gives a balance of surplus. what happens in fixed exchange rate system in the L M equation you have reserves plus domestic credit. Now, the reserve r component increases our banks now have more foreign exchange because money is coming from outside reserves go up.

Reserves go up means essentially in simple words the L M curve will shift rightwards because the total supply of money in economy would go up. As reserves come in people do not eat dollar, they go to the bank convert that into Indian rupee then they go to their account and deposit it.

So, money supply in economy would go up as I earn as an exporter dollar, I do not come home and sit on the dollar. I exchange that dollar for Indian currency which I can use which means in the country now today we have extra money, currency Indian currency. We have extra Indian currency in the Indian economy because I have earned dollar, which I get convert it. The central banks reserve position improves because they now get the dollar from us and give Indian currency in return in exchange to us which we use. So, money supply goes out.

So, the L M curve will start shifting rightwards. Now, the question is how much the L M curve would shift. Fixed exchange rate system, I S will not change because of e change e is constant B P will not change because of e change because it is constant. So, the L M curve will shift and as I can see from the diagram L M will shift till you reach the new equilibrium which is at this point. So, L M will shift up to this point. So, the rate of interest will climb, output would increase, rate of interest would climb until it clears the money market completely and the new equilibrium is reached there.

So, that is the new equilibrium, this is the old equilibrium. This is the new equilibrium Y 1, this is d Y d G multiplier. This is essentially your d Y d G multiplier. Now, let me erase this part and go for d Y d M under fixed exchange rate system, that multiplier. In the I S L M module there will be no B P curve. So, when L M shifts it will be the intersection of L M and the I S at this point. That is the I S L M multiplier.

Student: Higher Output.

Higher output.

Student: ((Refer Time: 18:29)) Let me check the multiplier d Y d M, he says is weaker under d Y d M is weaker under this multiplier.

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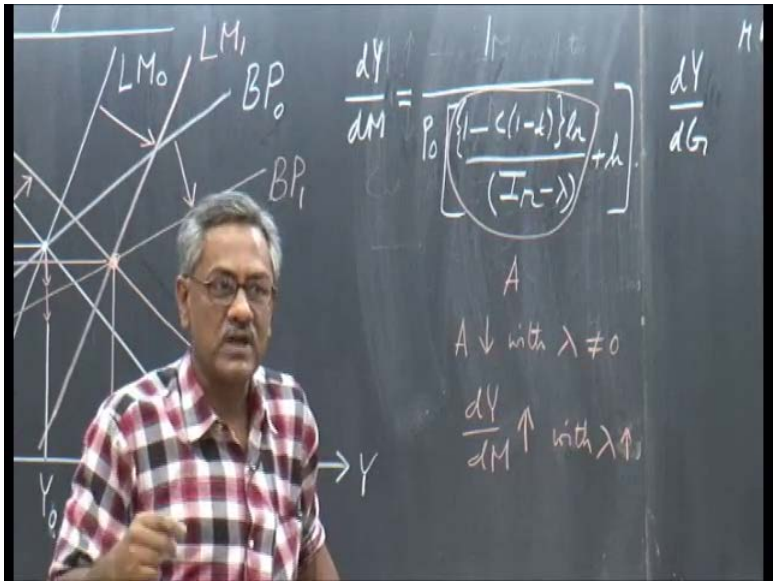

So, d Y d M is according to my notes, please check d Y d M is 1 divided by P naught into I minus c into 1 minus t into l r divided by I r plus h, no I r minus lamda. Now, lamda if it is 0 you have I S L M multiplier. With the lamda you have more term in the denominator. It is a minus term it is a minus term minus, minus becomes plus. More term in the denominator, means a smaller term here with lamda.

So, with a smaller term the value of the multiplier is larger. Smaller term in the denominator of a ratio 1 over the value of the multiplier is higher which is you are seeing in the diagram. Nothing less it is clear now with lamda being 0, you have a smaller term here, that means a larger term this ratio a larger term 1 over a larger term, will always be a smaller number. So, I S L M multiplier is smaller.

Let me explain that to you. This lamda makes this 1 a larger term. So, this whole thing call that A, A would fall with lamda not equal to 0, you agree with me or not. Lamda not being equal to 0 the A value would fall, you agree with me or not lamda not equal to 0.

If that falls then 1 over that number is higher. Therefore, d Y d M would increase. [FL] with lambda not being equal to 0 and increasing, with lambda increasing, right? So, a ratio divided by a ratio [FL] ratio divided by a ratio. So, when that ratio in the denominator increases, the multiplier which is 1 over that denominator falls. When that ratio in the denominator falls 1 over that ratio would increase. So, twp ratios are coming. So, that is why the confusion came. So, diagram is correct the diagram is correct, it shows that the multiplier is bigger because I S L M multiplier would have been here. I S and new L M intersection it is bigger than that, I S L M multiplier would have been here that is the I S L M position.

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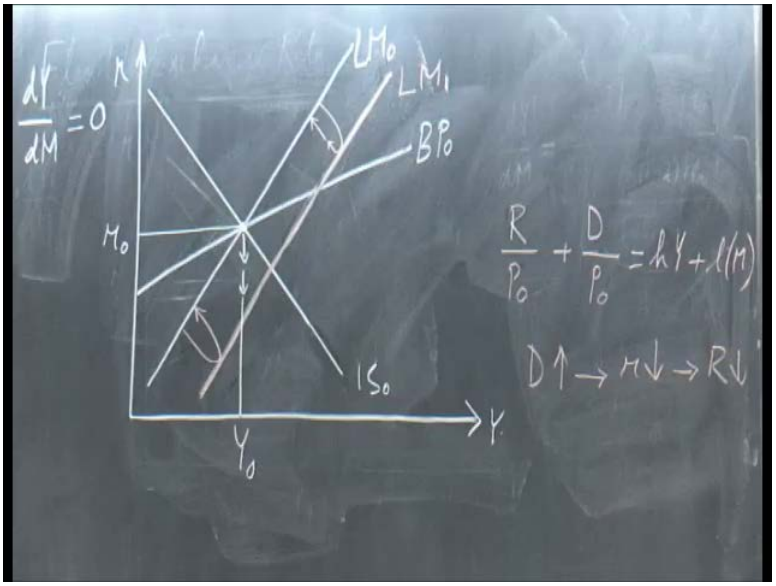

D Y d M under fixed exchange rate system. What you have here is a situation where I S is here L M is here and B P is here. Now, when money supply increases we all know that when money supply increases L M shifts to the right. Now, as soon as that happens money market is in disequilibrium because the left hand side of the L M equation is now a bigger value compared to the right hand side value of that equation. So, excess supply, it creates excess supply in the money market, which then makes that interest rate fall.

Now, when the interest rate starts falling to clear the money market, money is flowing out of the country, capital is flowing because. Our interest in lower foreign interest rate is higher. Let us put money there the speculator is the same smart speculators, pull out money from India in fact this happens over night. Now, with electronic systems and

internet they pull out money from any stock market anytime. Earlier it was difficult phone [foreign language] telegraph fax with internet now, you can sit in your hostel in fact I have been told that students sit in their hostel and speculate in the Bombay stock market from I I T Kanpur.

So, with internet you can connect and pull out money and put in Europe, U S, South East Asia. Somewhere where rate of interest is higher, when that happens money flows out. The r component of L M starts falling. So, L M curve although it has gone out, but then soon as rate of interest starts falling, it starts climbing backwards because L M will start shifting, r component is going down. So, long the deficit persists money is flowing out the L M would start moving backwards. So, it will start moving backwards and eventually it will move all the way there. So, this L M curve would move all the way to its original position. So, the output change will be 0.

In the L M equation what you have is you have, r divided by P naught plus D divided by P naught is equal to h Y plus l r. Now, what you are saying government is increasing D, but it creates rate of interest to fall it creates r to fall and this leads capital r to fall. So, eventually D increase will be exactly compensated by loss in foreign exchange, to the government through all moving out reserves flowing out of the country. So, that D D is equal to d r. So, no effect will be there in L M curve.

This increase will be compensated by a down reduction in r exactly matched. So, the L M curve having gone out will come back, all the way shift backwards. So, no change in output. So, if you look at this multiplier you will see d Y d M is equal to 0. If you check your notes you will see d Y d M is equal to 0.

Here as money supply starts increasing, the fall would be resisted and r would start moving backwards because that much of deficit, will now be eliminated in the foreign exchange market e is maintained. So, as reserves are flowing out there is a shortage of reserves, that will be created.

Student: If rate of interest increases it will have the same effect as L M curve shifting backwards.

Later on interest will finally, go back to the original position until the drainage of ours stops. So, long there is a deficit in the balance of payment, the drainage of reserves are

taking place which would counter the increase in domestic money supply. Domestic money supply is increased, but then it creates in the domestic market the reduction in rate of interest, which means the drainage of reserves from the country. Drainage of reserves from the country towards other country means that, money supply is again getting reduced because how is drainage of reserves happening.

People are going to the reserve bank for instant asking for foreign exchange. When they buy foreign exchange they hand over Indian currency to reserve bank to buy the foreign exchange. So, the drainage happens as L M has shifted out because of central bank of policy of whatever the increase money supply, is now countered by a reduction in money supply because all the speculators are now buying foreign exchange and surrendering Indian currency.

So, speculators are taking Indian currency bags full of them to the central bank and buying the foreign exchange and putting the foreign exchange outside. So, this counter position will go until r is below that r, where it started. When it reaches that r, r will not fall anymore, it will now start climbing upwards as money supply is reduced. The excess supply in the money market is reduced, excess supply always creates a drop in price. So, as excess supply is reduced the drop will fall and then whatever it drop it starts climbing up now.

So, long the deficit exists in the balance of payment. So, until it reaches that rate of interest this one, which where it started an output started. So, what you will find in fixed exchange rate system d Y d M is 0 as well as d r d M will be 0. You can check that out yourself d Y d M will be 0 d r d M will also be 0. Both the multipliers are 0, you will see if the algebra is correct. It will give you that result because this is quite clear from the diagram [foreign language] is below that critical level, foreign exchange will flow out of the country money supply will reduce.

Money supply means money supply in the private economy, central bank of government is outside like moon and the star. So, in the private economy, if there is more rain then there is more water, there is less rain less water. If there is more money, if exporters are running more private economy has more rupees because they cannot use dollar there is not a dual currency Indian system. We have only Indian rupee to be used here. We have dollar we have to go to the central bank and convert that into Indian currency. If we are

putting more dollar investing outside, then Indian currency would reduce because how do we get the by buying it, how do we buy it by surrendering Indian currency.

So, from the private economy Indian currency reduces, which it goes to the central bank which is outside the system. From central bank dollar comes to the people and the dollar does not stay there dollar is put outside again another country. So, buying of dollars reduces currency at home, selling of dollars increase currency at home. This you have to remember. If you are a exporter earning dollar you have to sell it to the r b I and get the Indian currency. So, the Indian economy has more currency Indian economy is the private economy.

It does not consists when I talk about Indian economy, does not consist of the government or the central bank. Government and the central bank are outside like the moon and the star and the Venus whatever. You can call them heavenly bodies. So, the heavenly bodies are outside, but their pull and push matters what they do to earth. You know the gravitational pulls there are critical balance probably between them.

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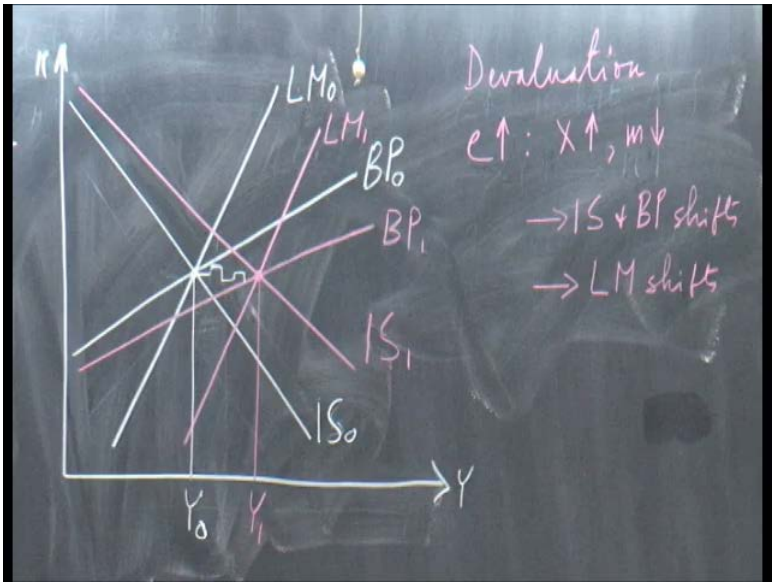

Final thing is devaluation how does it work, but similar devaluation that is I am going to look at d y d e, d y d e. So, what happens in d y d e, suppose e changes let us take the case e value is going up devaluation, which we call devaluation. Let us talk about devaluation, e value goes up what happens. If e value goes up, exports increase you know x and e has a positive relationship, marginal propensity to import falls. So, what

happens I S curve will shift to the right and also becomes flatter. So, the I S curve will be like this shift to the right and become flatter.

If you look at the slope of I S it is 1 minus c into 1 minus t plus M divided by I r. So, I S will become flatter, B P which is the slope which has a slope M over lamda, will fall will become flatter. I may have made a mistake here and as this happens you can see as B P is a surplus which is created because the I S curve has shifted to the right. And the B P has shifted, you from this position compared to the new B P curve, which is becoming flatter as the surplus is created.

When this happens because maybe the rate of interest was trying to climb above the old B P and the surplus is created, L M line will start shifting to the right because as reserves increase L M will shift to the right. Until the surplus is eliminated means you have reached a new B P and the new I S. So, this is where the L M curve would finally pass through.

In a very simple kind of an explanation. As this happens rate as this e happens this I S start shifting to the right more demand. The rate of interest would start climbing, but then L M will start shifting and the surplus will keep on shifting L M, until whichever way you may reach, I do not know this is kind of a path you may have towards the new equilibrium. Go up and down up and down adjusting the surplus and the disequilibrium in the money market [FL] I S is flattered, B P is flattered.

I S is also shifted out because exports have increased. The L M would finally shift and reach the new equilibrium point. You can see there will be a higher output level and it looks like the rate of interest in this diagram at least, where L M is steeper than B P in this diagram the rate of interest would marginally fall. Looks like the rate of interest would fall because the B P has shifted right. So, any intersection would be at a lower rate of interest seems to be, but you can check that d r d e diagram.

So, export increases and then what you have because of this you now have I S and B P shifts. L M shifts also because of surplus or deficit in the surplus in the balance of payment L M will keep on shifting to the right, until the new equilibrium is reached with a new B P, new I S and a new L M alright new B P new L M.

Everybody, now to have any questions.

Student: How accurately do these models represent the real world?

Very difficult to say, in theoretical model in social science if you construct. First thing you look for is the results that you get, whether they reflect the actual world results or not. If they do more or less with errors, there is always a margin for errors not with very high errors with small errors. If they do reflect then they are very good models. These modules work very well for western countries, but western countries had a free enterprise system. So, will private economy was dominant.

They had a free international capital flow, they had a flexible exchange rate system, in India we did not have those things. Now, India is approaching towards that place. So, this kind of a module will become more and more relevant to India, than what it was in the sixties and seventies and eighties and nineties. These modules have worked very well.

For western countries this is called a noble lariats name is associated with this module. It is called a Mandel Fleming model, Robert Mandel was a Canadian economist, who wrote it first and then Fleming's word name is also associated. These modules were constructed extension of I S L M module, which is for closed economy to an open economy with fixed prices. It is a very short run module fixed price is very I mean they are very short they are not long run predictors. For over short run periods business cycle do their predict they are found it work.

They work very well these models, but there are lots of open economy models out there, even for western countries. Those are the people who are writing those modules more features more just like. A simple computer as opposed to the modern computers we have like Xerox first invented that computer desktop in the seventies Xerox, but then we have reached this Microsoft windows imagine that advancement, but some of the basic things remain the same.

So, imagine for a social science where human beings each can be different from each other, but still they form something called a configure in economy. Then human beings who look different also entirely they also form a country. You are trying to frame one theory for all of them may not work who are the understandable. Even a model for development which is applicable to West Bengal may not work for U P, within that country because people and latitude and the culture and the language and the history are

so different that a model which work for Bengal. Like they talk out Kerala model often. Kerala is high in illiteracy, Kerala module may not work for U P, the Bengal nodule may not work for U P. The Maharashtra model may not be suitable for Bihar. So, in terms of models in social science, is very difficult to predict, very difficult job I tell you, but it is very challenging too.