International Economics

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Module No. # 01

Lecture No. # 10

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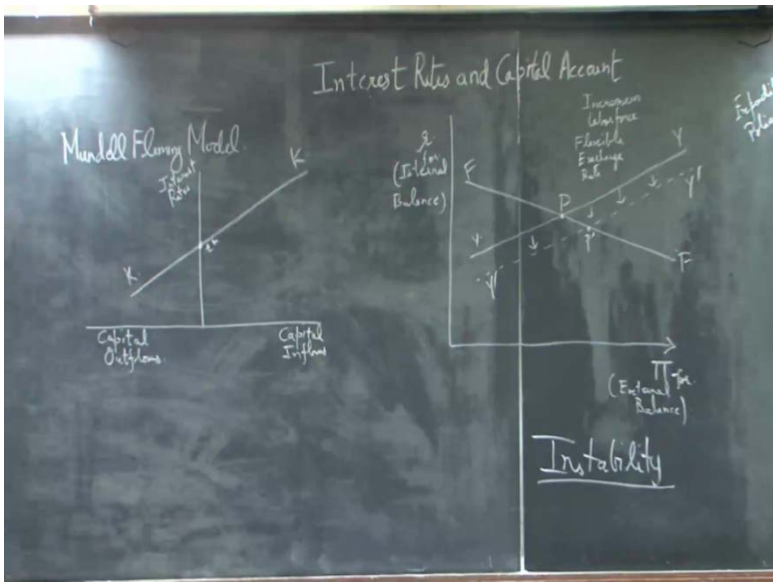

Good afternoon. We are going to talk about the interest rates and capital account today. And, we will discuss the Mundell Fleming model, which relates the interest rates with the capital flows. So, till date we have been discussing about the open economies, but the open economies were in context of the marginal propensity to import. The marginal propensity to import in an open economy was greater than the marginal propensity to save. Now, we explicitly take into account the capital flows, and how interest rates have an impact on the capital flows. So, now the interest rates have two effects, one on the absorption on the expenditures and the other on the balance of payments.

So, the Mundell Fleming model which came in the sixties talks about, how interest rates effect the capital inflows and outflows. This is a very simple description of the Mundell Fleming model. On the Y axis, we have the domestic interest rates. On the x axis, you have the capital inflows and capital outflows. So, what Mundell Fleming model is saying is that, if the domestic interest rates exceeds the foreign interest rates. You would see a

capital inflow, and if the domestic interest rates are lower than the foreign interest rates, you would see the capital outflow. We are yet to discuss the impact of the exchange rate changes; we are not bringing in into account the exchange rate changes which may happen. If you put the capital in a foreign country we are not discussing that, we are just discussing that capital flows is an is a function of the differential interest rates between domestic and foreign.

So, if the domestic interest rate exceeds the foreign interest rates, you will see a capital inflow. If the domestic interest rates are lower than the foreign interest rates, you will see a capital outflow. Reason, because higher interest rate gives higher returns. So, you see an inflow of capital, now if this K K curve which you see is upward sloping. This assumes that there is a imperfect substitute ability between domestic and foreign bonds. That means, if the interest rates increases, if the domestic interest rate is greater than the foreign interest rate. You will not completely switch out of domestic bonds into foreign bonds, because foreign and domestic bonds are not perfectly substituted.

So, the reason that you have an upward sloping curve is because that there is imperfect substitute ability between domestic and foreign bonds. If there was perfect substitute ability between domestic and foreign bonds. As soon as the domestic interest rate is say lower than the foreign interest rate, there will be a sudden shift, complete shift out of the domestic bonds into the foreign bonds. And, that differential will not remain any differential after some time. It will come back to a level where the domestic interest rates will be equal to the foreign interest rates.

So, if there is perfect substitute ability between domestic and foreign bonds. You cannot see a differential to persist over time. The K K curve would be horizontal in this case.If there is perfect, if there is imperfect substitutability. You will see the K K curve to be vertical, if there is no substitutability between domestic and foreign bonds, the K K curve will be vertical.

So, three cases one an upward sloping K K curve depicting that there is imperfect substitutability between domestic and foreign bonds. A horizontal K K curve showing that the domestic and foreign bonds are perfectly substitutable and vertical K K curve saying that there is no substitutability between domestic and foreign bonds. So, this is the most simple description of the mundell flemming model and. So, if there is imperfect

substitutability, you keep on investing in foreign bonds. If they are fetching you higher interest rates. So, the capitals will persist, capital flows will persist.

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This does not talk about the exchange rate at all, constant, nothing. We have not talked about the exchange rates, now as soon as you bring in the exchange rates. And you have a flexible exchange rate, and what you do is? That, for internal balance, you have the interest rates on the y axis. And you have exchange rates in the x axis; now see how instability will come in the economy. So, the only difference between what we have been discussing so far is that? Instead of the expenditure policy, the tax rates and the interest rates, we have now put interest rates here, for the internal balance.

And, we have exchange rate for the external balance and this is a case of flexible exchange rates. Now, when you have capital mobility, see what happens to this F F curve? Up till now, we have been we have seen that the F F curve is takes a shape which is this. And here with capital flows, the F F curve has a slope like this, it is more flatter.

Why? Again look that it is downward sloping. Because, with an increase in pi it leads to a switch in expenditure from foreign to domestic goods. It is leads to a increasing in pi leads to depreciation of the currency. Depreciation of the currency leads to an improvement in the balance of payments. So, the only way to bring back your balance of payments surplus into equilibrium is to have a lower interest rates.

Now, when you have lower interest rates, it you will have higher income through the Keynesian. Higher income would mean higher imports; higher imports would mean that your surplus will come down. But that is not the only effect on the balance of payments, interest rates have other effects. If interest rates go down according to the mundell flemming model, if the interest rates go down, there will be a capital outflow. So, your balance of payment will quickly come back to equilibrium.

So, interest rates have two effects, one on the absorption, this is what you have to internalize. This is what needs to go inside your head, that when interest rates come down, it has an impact on absorption, expenditure and on balance of payments. And that is the reason that you see a flat F F curve, because a small change in interest will bring back changes which will bring back economy back to equilibrium. And I will have

equations which will show that the slope is such that the F F curve is flatter than the earlier case, when the F F curve was steeper.

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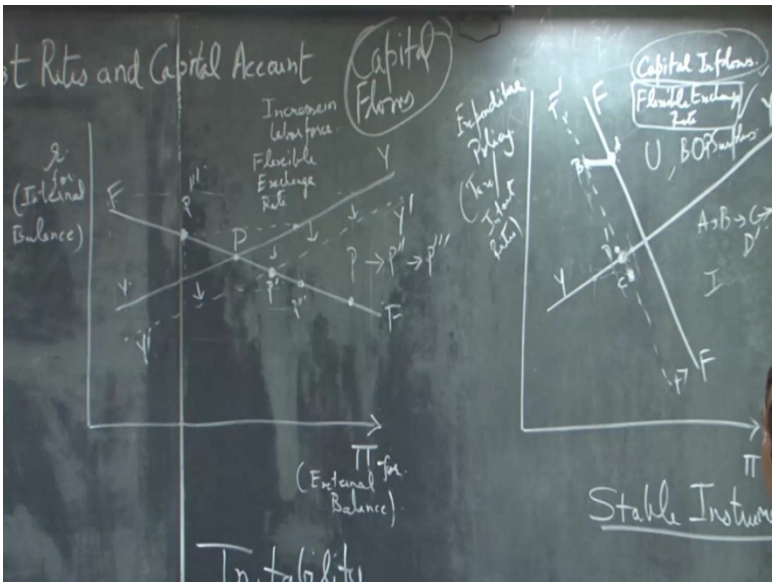

To just recall, let us look at this diagram where you had a set of stable instruments. Again come back to that diagram where you had expenditure policy, you had tax and you had interest rates. So, both monetary and fiscal policy was on the y axis. If you moved up, it would mean more restrictive expenditure policy, if you moved here on the right. It would mean deprecation of the currency.

Now, this is a case of flexible exchange rates. So, you cannot be out of the F F curve, because in a flexible exchange rate, you will always have a balance of payment equilibrium. And any change in demand and supply will change the exchange rates and their cannot be any balance of payment deficit or surplus. The changes in exchange rate will curve the deficit will curve the surplus.

So, see if you are at point a, you are above the y y curve. So, there is unemployment and there is a balance of payment surplus. So, if you have a balance of payment surplus and if you have unemployment, think of a scenario, where capital inflows take place.

So, when there is a capital inflow, it would lead to a balance of payment surplus. When it will lead to a balance of payment surplus, you would require less restrictive expenditure

policy. And if you recall the equations, the F F curve will shift down; it will shift to F dash F dash.

So, immediately when you will see capital inflows, it would lead to appreciation of the currency you the movement will be from a to b. But B is still above y y , where you have unemployment. So, when you have unemployment you have to adopt less restrictive expenditure policy. Now, see the difference between, how the economy moved in fixed and flexible here. The economy will not come to the y y curve, but it will move from B to c directly.

Reason being that, you cannot, the economy cannot be out of the F dash F dash curve. You cannot have a balance of payment disequilibrium when you have a flexible exchange rate. So, the movement will be A to B, B to C then C; you are below y y you have inflation. So, you adopt more restrictive expenditure policy, you cannot come to this point D, but you will come to a corresponding point D dash. So, C to D dash, D dash you are above y y curve, there is unemployment. So, you adopt less restrictive expenditure policy you cannot come to y y, but you come here.

So, movement is this, then this, then this, then this, then this and then finally, to the equilibrium point. So, an appreciation, then a depreciation, then an appreciation, then a deprecation and then finally, to the equilibrium point. This was the case, when you had capital inflows, and you had a flexible exchange rate. And, you had stable set of instruments. There were no capital flows like, what we see now, what is happing now days. These, capital flows what we saw, at least in the face of the East Asian crisis, what triggered the crisis was a sudden outflow of capital from the so called Asian tigers. Hundred and fifty billion U S dollars moved out of these five east Asian countries in 1997.

So, you see lot of movement of capital taking place. I am not saying that it is only a function of interest rates, when we discuss more about it, you will see capital flows is a function of so many things. It is not only the interest rates, but there are other factors which are also important. So, what determines F d I inflows, there are other set of factors which are important, but this is the first theory which related capital flows to interest rates.

Now, as soon as you bring in capital flows here, and you have a flexible exchange rates, it brings instability in the system. So, then you need to change the set of instruments, you will just see that monetary policy, then the stable set of instruments would be that the monetary policy goes for maintaining external balance. And fiscal policy goes for maintaining internal balance. Earlier, we were clubbing monetary and fiscal policies together for taking care of the internal balance. And, for external balance we had the exchange rate.

So, here, when you have the capital flows coming in. You can keep your exchange rate as outside the system .You can maintain it as it is, and you can have monetary policy for internal balance monetary policy for external balance and fiscal policy for internal balance .And so, if you keep on fixing the interest rates for internal balance and pi the exchange rate for external balance.

See, what instability come? See, how the instability comes in case of a flexible exchange rate? So, you have capital flows here. So, it is the Mundell Fleming type of framework. Where you have capital flow? So, the F F curve is flatter now, because interest rates tend to have an impact on not only absorption, but on balance of payments also.

So, there is an increase in labour force .When there is an increase in labour force, it leads to an increase in target level of income. So, you need less restrictive expenditure policies to achieve higher incomes. That means, the y y curve shifts down. So, this is the new y y curve, you are above the y y y curve. You have unemployment in the economy and because it is a flexible exchange rate.

So, you are at point P, there is a balance of payment equilibrium. The only problem is that, now you in context of P dash, you have unemployment in the economy. So, when you have unemployment in the economy, you adopt less restrictive expenditure policies. You should come here, but, because it is a flexible exchange rate, you do not come here. You come to a corresponding point which is say P double dash; P double dash is a point which is below y dash y dash.

So, you have inflationary conditions, if you have to achieve the internal balance, you adopt more restive expenditure policy. So, you go to this point, you from P double dash you are below this y y curve. So, you the corresponding point is a point here. So, from

here, you move to a point like. So, the movement is P to P double dash to P triple dash then some point here .And, so you never reach an equilibrium which is P dash.

You never reach the equilibrium which is P dash, which is an intersection of y dash y dash and the F F curve, it is different from this. Because, here you would move to the equilibrium point this. Here, see the movement first there is an increase in labour force the y dash y dash comes here, you need to read P dash, this is above this. So, you have a situation of unemployment.

Sir,

Sir (( )) y double y dash then y y is (( )) why are you joining from P double dash point on y y. (( )) y dash y dash (( )).

No.

Why? we (( )) P double dash (( )) y by (( )).

From.

From P double dash.

P doubles dash to.

Y by (( )) we should leave that y dash y dash.

(( )) small larger than (( )) we should not y dash (( )).

Let us see I think. So, let us see.

(No audio 20:44 to 21:24) may be small correction, let us see whether the diagram is made correctly or not.

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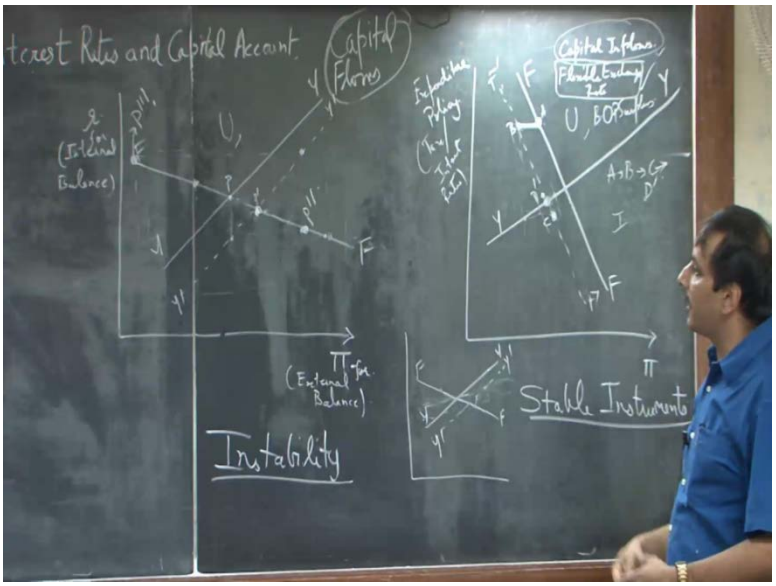

Let us see.

(No audio 21:35 to 22:04).

Correction, see the F F curve, it is more flatter, but the y y curve is like this. And the slope of the y y curve is greater than the slope of the F F curve. So, when we derive the equations, we will we will see that this happens. So, I think I had incorrectly made the diagram, where this was more flatter; this would the more steeper because. So, I have to prove that the slope of this is greater than the slope of this.

So, if you we had worked with the equations, we could have got this. So, we will come back to the equations and then we will see, what happens. Now, let us see. So, here was the situation there is an increase in labour force. So, the y y curve shifts down. So, the y y curve shifts down, you have a situation, where you have above the y y, y dash y dash curve. You have unemployment and because it is a flexible exchange rate. So, you will not move out of the F F curve.

Now, see what happens. Less, restrictive expenditure policies. But you cannot come to the y dash y dash come to a point like P double dash. This is below the y dash y dash curve. So, you have inflation. If you have inflation more restrictive expenditure policy, you cannot come to this point. So, you move to a point which is P triple prime and this goes on. You will never reach a point like P dash.

So, what was missing in the earlier diagram was that, we need to compare the slopes of the F F and the y y curves. And of course, if I say that F F curve should be flatter I need to derive it through the equations. So, this is instability, if you have the interest rates for maintaining the internal balance and the exchange rate for maintaining the external balance.

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So, the reason that we are keeping this is, because we are saying that interest rates have two set of effects. One is on absorption and the other is on the balance of payments. So, let us keep the monetary policy, as your instrument for maintaining the internal balance. And your exchange rate for maintaining the external balance. This is by assumption monetary policy for internal balance and this pi for external balance. Now, when you derive those equations you could have had fiscal policy for that for maintaining internal balance. And pi for maintaining external balance, the same set of results would have come.

So, the results show that in the wake of capital flows monetary and fiscal policies have to be assigned different set of policy targets. Monetary policy for external balance, fiscal policy for the internal balance. So, let us derive the equations, because we need to show that the slope, we need to compare the slope of the F F and the Y Y curves here. And then we will show a case, where you would have the stable set of instruments in the wake of the capital flows.

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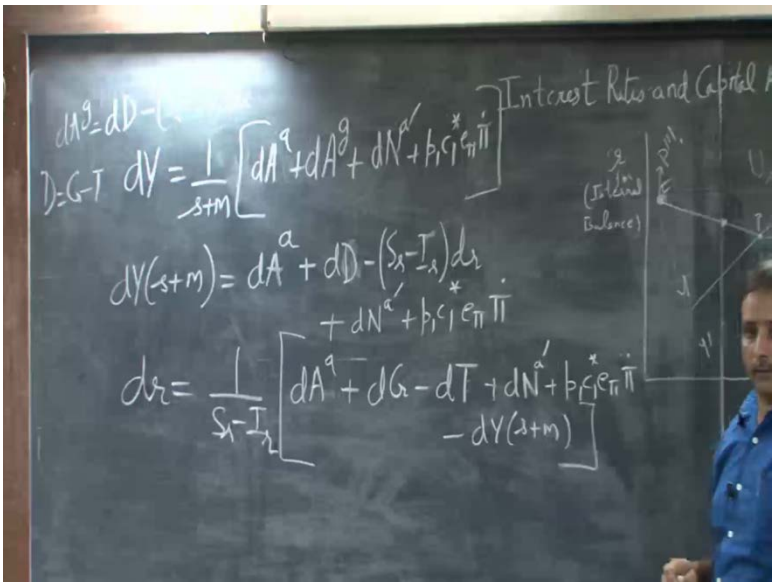

So, the equations are the same d y is equal to 1 upon S plus M. d A a plus d A g and instead of d N a ,you have d N a dash plus P 1 c 1 star E pi pi dot. So, d y S plus M d A a, but we need to open up d A a which is d G minus S r minus I r d r plus d N a dash plus P 1 c 1 star E pi pi dot.

So, then d r becomes 1 upon S r minus I r d A a, this is d D. So, this is d G minus d T plus d N a dash plus P one c one star E pi pi dot minus d y S plus m. So, remember d A g the policy induced expenditures d A g equals d D d minus S r minus I r d r d was g minus t government expenditure minus taxes. So, you get d r is equal to one upon S r minus I r d A a plus d G minus d T plus d N a dash plus P 1 c one star E pi pi dot minus d y S plus m

Now, look at the slope is 1 upon S r minus I r, and there is a direct relationship between r and this difference S r minus I r. What happens if the interest rate goes up? If the interest rate goes up, S r goes up I r goes down. Because, there is an inverse relationship between I n r. So, S r minus I r is a positive as r goes up S r minus I r is positive .If r goes down, savings goes down, investment goes up, S r minus I r is negative.

So, the slope earlier was tan 45, but now, it is one upon S r minus I r. An angle which is lower than 45 degrees. But, we have not still answered, how we will compare the slopes of this with the slope of the F F curve. This is the y y curve, y y curves equation is this. Only thing is that we have brought in rate of interest on the left hand side and on the

right hand side all others are shift factors. This comes with a slope one upon S r minus I r. Now, let us see the slope of the F F curve.

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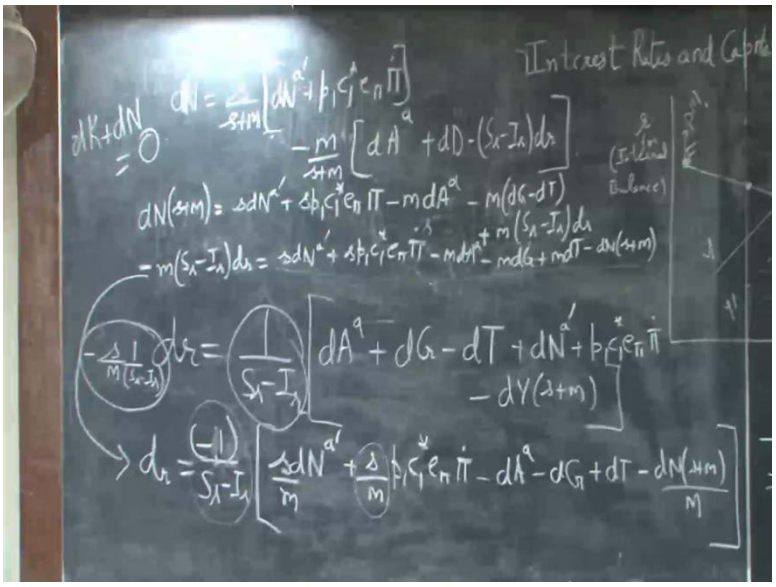

Let us see the slope of the F F curve, the F F curve d N S upon S plus m d N a dash plus P 1 c 1 star E pi, pi dot minus m upon S plus m d A a and d A g is d d minus S r minus I r d r.

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See, it will be an angle which will be lower than one upon S r minus I r.

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What is important is to compare the slope of y y and the F F at the end, is not it. The slope of the y y and the F F curve. And I am saying that this is a positive amount, if the interest rates goes, say increases, this will be a positive number. So, one upon that positive number, importantly we should compare the slope of the F F and the y y curve. Then we will get these stables instability in the system. So, that is what happens with capital flows. You will see that interest rate has an extra impact, it has an impact on absorption, it has an impact on the balance of payments.

So, let us workout the slope of that and then compare it with this slope. Then we can say. (No audio 32:50 to 35:30)

Now, look d n S plus m S d n a dash plus S P one star c one star E pi dot minus m d a a minus m d d which is d g minus d t plus m plus m S r minus I r d r. So, if you take this term there on the left hand side minus m S r minus I r d r. And, these remain as it is, with d n term going there and remember d K plus d n is equal to 0. Because you are on the F F curve K plus n is equal to 0, that is capital account balance plus the current account balance plus the capital inflows is equal to 0.

So, from here you get minus one S r minus I r ,S plus S by m d n a dash, S by m P one c one star E pi pi dot. I want you to concentrate on this and this, 1 pi dot and r have a negative relationship, if pi dot goes up r has to go down. Why? Because pi dot if you increase pi there will be depreciation, there will be improvement in the current account balance, there will be a balance of payment surplus. So, the, if you have to take care of the balance of payment surplus, you have to reduce the interest rates.

It has two effects one on the absorption, the other on the balance of payment. If the interest rates go down, the incomes go up. The imports go up if the interest rates go down there is a capital outflow. So, the balance of payment surplus comes back to equilibrium. So, the slope which is attached to that pi pi dot term is S by m and with a negative sign one upon S r minus I r one is this is. The slope of the F F curve and the slope of the y y curve is this, which one do you see has a lower slope. And, remember it is a negative sign. So, it is an angle which is greater than 90.

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Why not. This is S by m into one upon S r minus I r, this is one upon S r minus I r

(( )) go S 1 1 goes and one go here.

It was S by m for the F F.

(( )) 1.

One for the other. So, S by m was greater.

And here also it remains c.

But do can you look at these, this S and m can you look at this S and m.

Equilibrium. (( )).

So, think of two scenarios when S is greater than m and when S is less than m. Remember this is an open economy. So, m can be greater than S, now do, what do you think will happen to this? If m is greater than S, it is an open economy.

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Earlier it was one and it was S by m, it was a normal economy. Now we have, we are in the sixties and the seventies and eighties. We have, we are an open economy, marginal propensity to import much larger. So, if this is greater than this, what can you say about this slope and that slope?

We have been (( )) (( )) change in the d n with a d K and write d K in terms of d (( )) and put the (( )).

So, that we will do when we bring in the capital flows. We can put d K and d K as a function of the rate of interest. But, before that I want to understand the relationship between interest rates and pi. Because, we want to analyze this particular thing, when we do that particular thing when we put d K. What I would show is that, we will see a relationship between interest rates and tax rates.

Because, monetary policy will go for maintaining external balance, fiscal policy for the internal balance. I do not want to do that, I just want to understand this diagram and see in an open economy context. When I say that interest rates have two effects, one on the incomes absorption and the other on the balance of payment, how is it translated in the in this equations.

So, if m is greater than S. So, this will be a fraction. This is one upon S r minus I r. So, you will see that this slope will be lower than the slope of this. And therefore, this slope would be lower than this slope ,now the diagram has to be made in such a way that the tan this is not an tan 45 is not one. So, it has to be like this, but then what is important is that you need to show that this slope is lower than this slope.

That is the so, tomorrow we will see we bring in capital flows, we will replace this by d K and then we will express K as a function of interest rates. And, then we will bring in

another diagram, where you have monetary policy for external balance, fiscal policy for internal balance.

(( )) last one goes the (( )) 54 all because of the capitals (( ))

Both, because we have brought in capital account and we are saying that it because, it is an open economy. It is inviting capital from aboard; it is an open economy where n P m is greater than n P S. And, because it is an open economy, we have brought in the capital flows.

We got (( )) consider (( )) just that you are saying that (( )) an open economy that is why the curve is.

So, you can bring in this d K here and you can replace this, but then this is happening because. Remember this term that d G term. We opened it to be d d minus S r minus I r d r and. So, we are explicitly taking into account this interest rates. And when you say slope is the impact of the for a unit change in exchange rate. What is the change in the interest rates? What is the relationship between rate of interest and the exchange rates?

The others are of course, the shift factors, but we the slope means that we want to understand this impact on the d r which works out to be this. It was now, it was only S by m, earlier it is become one upon minus S by m one upon S r minus I r, because you want to explicitly bring interest rates. Why bring in explicitly interest rates, because here you see that interest rates also have an impact on the balance of payments; that is the reason. But, because interest rates have an impact on investments, savings, absorption. So, that is the slope that works out here all right, Thank you.