**Lecture No. # 11**

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Good afternoon. Today, we will continue with, what we were doing in the last lecture, that is discussed the topic of interest rates and capital account. Yesterday, we saw the discussion on Mendel Fleming framework; the Mendel Fleming model, which said that the capital flows are a function of the domestic interest rates and the foreign interest rates. If the domestic interest rates exceed the foreign interest rates, there will be capital inflows. If the domestic interest rate is lower than the foreign interest rates, then it will lead to the outflows of the capital. Now, we will see how this particular thing impacts the stable set of instruments, for achieving our policy targets.

I am going back to the equations for the YY and the UU curve. UU curve is something which we will introduce today, and the YY curve is the curve which gives different combinations of expenditure policy and the exchange rate, which gives you the internal balance. The equation for the YY curve shows you, if you work on this particular equation where the changes in income is a function of the private expenditures, the policy induced expenditures and the autonomous changes in the net exports; d A a is d I

a minus d s a, autonomous change in investments and autonomous change in savings; d means the changes d I a minus d s a is d A a. d A g comprises of variables which depict monetary and fiscal policy; this is d D, where d is g minus t. And you have the interest rate that is d r and s r is the impact of the rate of interest on savings.

I is the investments, which is a function of rate of interest, savings as a function of rate of interest. This is d A g plus this d N a part is bifurcated into entirely autonomous term d N a dash and something which is a function of the exchange rate comprising of the Marshall Lerner Robinson condition, that is e pi, which is greater than 0; e pi was e 1 star plus e 2 minus 1. I am sure; you are familiar with this equation, because this is what we have been discussing for long. Now, for the equation for the YY curve, if you solve for d r, you would get this to be 1 upon s r minus I r d A plus d g minus d t plus p 1 c 1 star e pi pi dot plus d N dash minus d Y s plus N.

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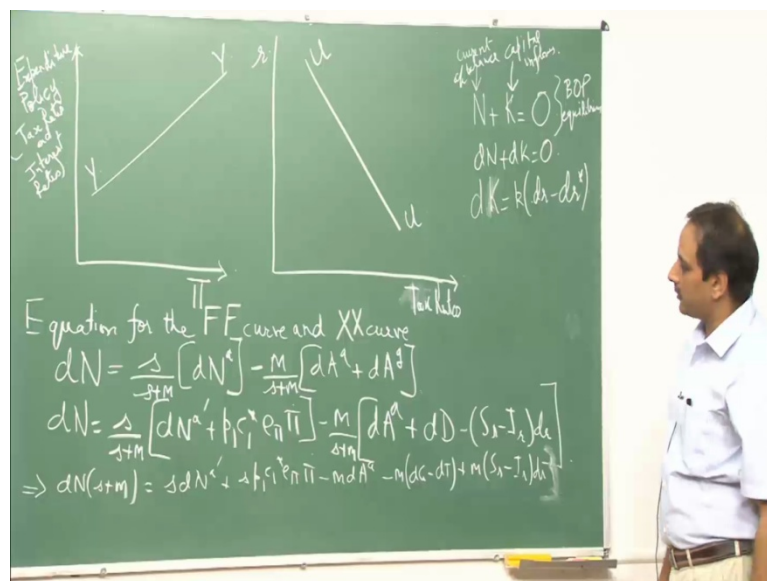
Now, if you draw the two sets of diagrams, one is you have expenditure policy, which is tax rates and interest rates both club together, and here you have pi the exchange rates. Then this YY curve is an upward sloping curve, because if you see the relationship between the expenditure policies that is tax rates and interest rates and pi, you would get an upward sloping YY curve. If I had carried on by having by not bifurcating d A g, if I would have from here express d A g as a function of the other variables.

I would have got the YY curve, because this shows the relationship between the tax rates and interest rates and pi. We are now interested in getting another curve which is the UU curve, which also shows different combinations of interest rates and exchange rate, which will maintain the internal balance. Now, this where you have rate of interest on the y axis and exchange rate on the x axis ==sorry== there is a small correction instead of pi, you have the tax rates. In the x axis, you have the tax rates; on the y axis you have the interest rates. This shows different combinations of rate of interest and tax rates which will maintain the internal balance.

Now, you can see from this equation the relationship between the interest rates and the tax rates and you can see that the interest rates and tax rates are inversely related. Why it is downward sloping because if you increase the tax rates it reduces the aggregate demand in the economy it reduces incomes. The only way to increase the incomes is to reduce the interest rates, because that will promote investments and incomes and. So, you will be back to equilibrium. We are going to now work on the equations for FF curve and XX curve. So, please recall the equation for the changes on in the net trade balance it was equal to s upon s plus m d N a minus m upon s plus m d A a plus d A g. d N is equal to s upon s plus m you have the autonomous component, the induced component and this is further policy induced expenditure is further divided into d minus s r minus i r d r.

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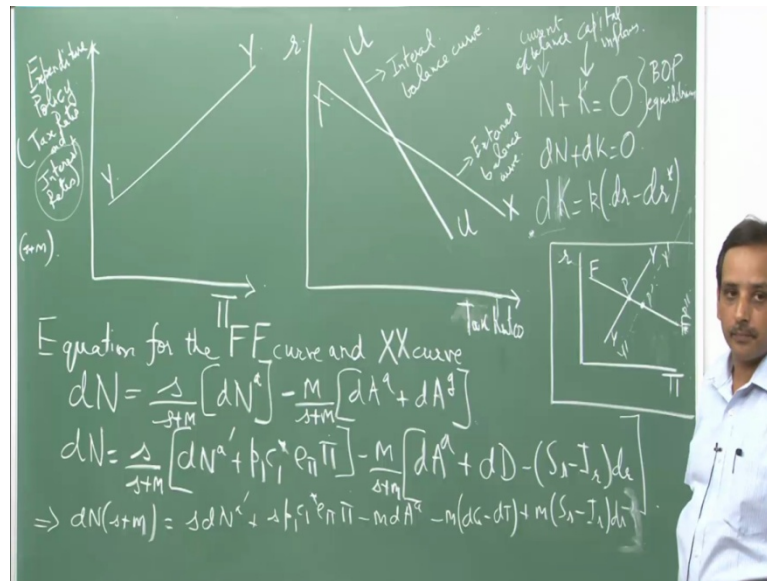
So, you see this equation now when we introduced the Mendel Fleming framework N plus k is equal to 0 that means, along the FF curve we had a balance of payment equilibrium the current account balance. If it is matched by capital inflows, it leads to the balance of payment equilibrium. This shows balance of payment equilibrium, d N plus d k was equal to 0.

Now, further we introduced that this capital flows are a function of the differential interest rates. So, that is the difference between the FF and the YY curves that we got earlier. Now we have introduced capital which is a function of the domestic interest rates and the foreign interest rates. We are going to put it in this equation and see how we will get another set of curve which will be called the XX curve. So, I am going to move from here to this part of the black board to get the equation for the FF and the XX curve.

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Now, please focus your attention on this particular equation that I get and also recall the diagram that I made yesterday, where related the interest rates with the nominal exchange rates. I was trying to convince you that incase the economy keep using interest rates for maintaining internal balance and use exchange rate for maintaining external balance and if you have capital inflows, which are functions of the interest rates, then it brings instability in the system. And then I was trying to tell you that, this FF curves slope is less than the slope of the YY curve in the wake of the capital flows, where capital flows are a function of the interest rates

If you would recall the diagram that we discussed yesterday, we said that there is an increase in labor force. Increase in labor force leads to an increase in target level of an income. When it leads to an increase in target level of income you need to have less restrictive expenditure policies to achieve that higher level of incomes. It would mean that your YY curve shifts down and it reaches Y dash Y dash, this is your new equilibrium point. Here is an economy, which is open in the sense that the capital flows are coming in they are a function of the differential interest rates, it is a flexible exchange rate regime. You cannot move out of the FF curves and then something else happens, there is a shock in the system that there is an increase in labor force.

Now you were earlier here, if the new equilibrium point is p dash, you in this scenario when you have capital inflows this will bring instability in the system because now the point p is above the Y dash Y dash curve. You have unemployment in the economy. You need less restrictive expenditure policy. So, you reduce the interest rates and you find a corresponding point on the FF curve, which will be somewhere.

Here you cannot be out of the FF curve because; this is a flexible exchange rate regime. So, you move from not you do not move from p to p dash, but you move to an unstable point like p double prime; p double prime is a point which is below the Y dash Y dash curve. You have a situation of inflation. So, you adopt more restrictive expenditure policy. You have to reach a point like this, but you cannot be out of the FF curve. So, you have to find a corresponding point on the FF curve which will be somewhere here.

If you keep moving, you will move. You will never reach a point like p dash because; this capital inflow brings instability in the system in the light of the flexible exchange rate. Then the stable instrument, the set of stable instruments changes when you have capital inflows which are a function of interest rates you cannot have a monitory policy for maintaining internal balance and an exchange rate for maintaining external balance you need to change the set of instruments.

So, what we will see is that now in the light of the capital flows these stable set of instruments are that the monitory policy that is the interest rate goes for maintaining the external balance and tax that is the physical policy goes for maintaining the internal balance. Another point, here the FF the slope of the FF curve is less than the YY curve. You can see this from the fact that as some of you did say after the class yesterday, that sir the capital flows are a function of the interest rates.

Now when capital flows become a function of these differential interest rates and you put it here. You get the rate of interest as a function of these variables and if you relate rate of interest with pi that is, what we are doing here. Please have a look at the slope which is s r minus I r plus k r, where k r is k times s plus m by m. it is a positive number. Your slope, if you compare it.

This is the equation for the FF curve and compares it with the slope of the YY curve, which shows relationship between interest rates, and pi you will see that the slope here is

higher than the slope of this line, which is the relationship between interest rates and pi. And then of course, there is a negative relationship between pi and the interest rates.

Now, in the wake of the capital flows, which are functions of the differential interest rates? We find that the stable set of instruments are different, they are no longer expenditure policy and pi. The stable sets of instruments are that this expenditure policy is now bifurcated physical policy goes for maintaining internal balance. Interest rates go for maintaining the external balance. And you keep the exchange rate as fixed you study the relationship between interest rates and tax rates.

Now, again there are two sets of curves one is the UU curve and the other is the XX curve. The UU curve shows different combinations of interest rates and tax rates, which will give you internal balance.

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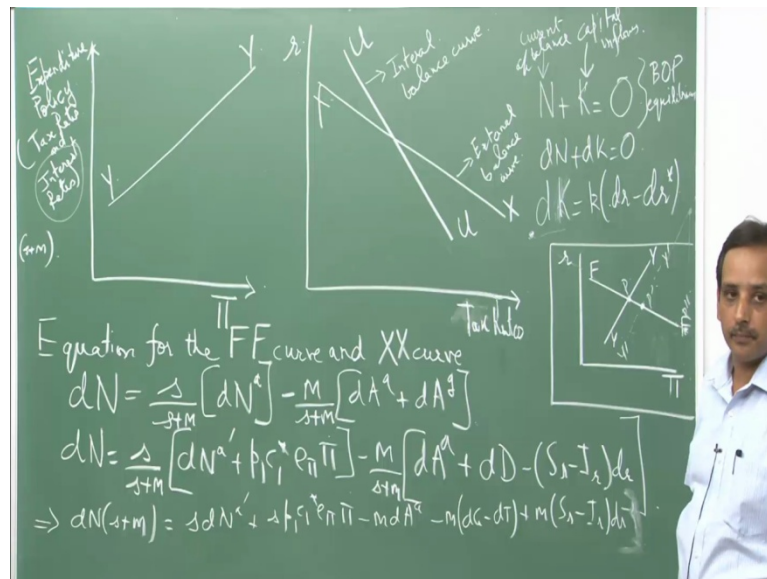
So, this is the internal balance curve and you have the XX curve, which is the external balance. Please see that both of them are downward sloping. Earlier our internal balance curve was an upward sloping curve. It was called YY curve. YY curve has been replaced by the UU curve which is downward sloping and you have the XX curve, which has got a lower slope than the UU curve.

Why are they downward sloping? First look at the internal balance curve they are downward sloping, because if you increase tax rates it would lead to a decline decrease

in aggregate demand. It leads to a decline in incomes. So, if you have to raise the incomes bring back the economy back to equilibrium, you have to reduce the interest rates. You have the XX curve which is also downward sloping, because if you reduce tax rates it increases incomes. When you increase incomes, it would lead to increase in imports. When it when the increase in import, it leads to a balance of payment deficit. Now if you have to take care of the balance of payment deficit then you need to lower the interest rates for maintaining the external balance.

The difference is that these interest rates, they tend to have an impact not only on absorption, but also on the balance of payments. Now, please look at this equation again; try to understand the relationship between interest rates and now not pi, but the taxes which are d t. again you see that the relationship between interest rates and taxes they are negative and it comes with a slope, which is s r minus i r plus k r.

you have a lower slope for the XX curve as compared to the UU curve, which shows relationship between the rate of interest and the taxes again you have a negative relationship, but then you have a slope, which is higher than the slope here which is s r minus ire plus k r. So, then the point at which they intersect this will give you the optimal level of rate of interest and tax rates which will maintain both internal and external balance. Now given this equilibrium, there is something, which happens in the economy that shock is again an increase in the labor force.

So, when there is an increase in labor force, it leads to an increase in target levels of income. The only way to take care of this increased income is to reduce the interest rates have less restrictive expenditure policies. So, your UU curve shifts to U dash U dash; your new equilibrium point where you get both internal and external balance is not p now p dash. You have this new internal balance curve U dash U dash and you are now in a situation the economy is above the U dash U dash curve.

A point, which is above the U dash U dash curve depicts that you have unemployment in the economy. It is a point on the XX curve. So, there is no problem of the balance of payment. You are on the XX curve so, there is a balance of payment equilibrium, but because there is an increase in labor force you are in a position, where the economy faces unemployment. So, what do you do about? If you have unemployment in the economy you need to raise the incomes because by raising incomes, it will take care of this

unemployment in the economy. What you do is that from here you reduce the tax rate. So, that you reach a point on the U dash U dash curve. You reduce your tax rates in the hope that it will take care of the internal balance, but then once you reach here you are below the XX curve, below the XX curve shows a situation, where you have a deficit in the economy. Why? Because any point below the XX curve, you have a deficit, because if you have lower interest rates. You will have higher incomes. Higher incomes would lead to higher imports you will have a deficit.

If it is above FF you have higher interest rates lower incomes lower expenditures lower imports you have a balance of payment surplus But now, you have reached a point like this you are below the FF curve you have a balance of payment deficit. If you have to take care of the deficit now, the new instrument, which is available to you, is the interest rates. Reasons being that interest rates have an impact on not only the absorption, but also on the balance of payments. By raising interest rates, you hope that the money will come in and when the money will come in it will take care of the balance of payment deficit. So, you reach a point like this on the XX curve. But when you reach a point like this on the XX curve, you are above the U dash U dash curve. You again face a situation of unemployment in the economy.

If you have to take care of the unemployment you have to reduce the tax rates to reach the point on U dash U dash curve you are back to internal balance, but you are now below the XX curve. If you are below the XX curve again there is a balance of payment deficit, if you have to take care of the deficit, now you have another set of instrument which is the interest rate. So, you increase the interest rates, again you reach a point on the XX curve, but you are above the U dash U dash curve. So, again you reduce the tax rate and this goes on till you reach the equilibrium.
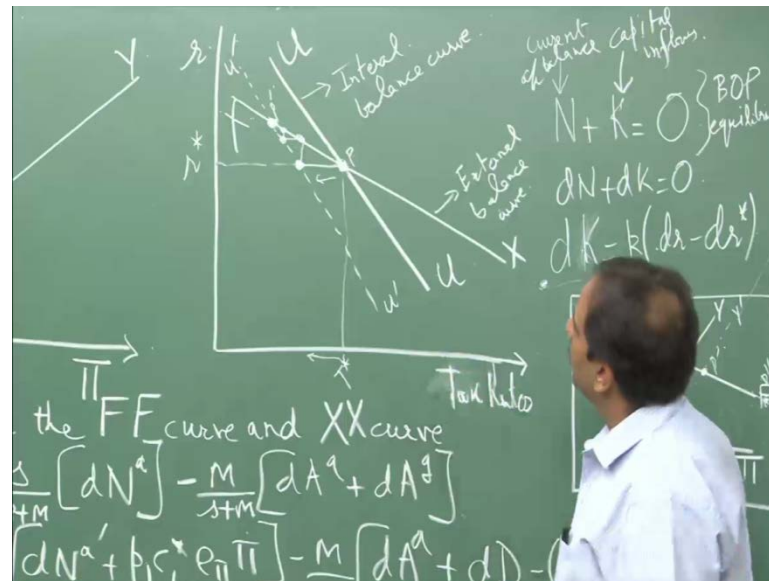
This diagram shows that if you combine interest rates with tax ratios, you can achieve your internal and external balance. Now this happens, because you have introduced capital flows. In the wake, in the light of the capital flows, which are functions of the differential interest rates; the set of stable instruments changes it is not that you consider expenditure policy entirely for the internal balance. Now, this expenditure policy has to be bifurcated interest rates is the monetary policy this goes for external balance and tax ratios goes for maintaining the internal balance.

So, Mendel the professor Mendel was concerned about pairing of instruments with targets. So, in this scenario he said that, these will be the new set of instruments. Further we what we could do is. We will cover it up in the next class. Now we will relax one of the other assumptions that, we had made when we started doing the open economy model was we had assumed sterilization of the reserves. We had assumed that any changes in reserves will not have any impact on the money supply. Now we will relax that and then we will try to study whether monitory and physical policies have any impact on the changes in incomes.

You will see different set of results. Monitory policy you will see becomes effective in the case of flexible exchange rates; while physical policy will become effective in the case of fixed exchange rate with capital mobility. So, these are the set of results that we

will try to prove tomorrow. For today, we are ending up here. If there are any questions and queries, I will be happy to answer that. Thank you.