International Economics

Prof. S. K. Mathur

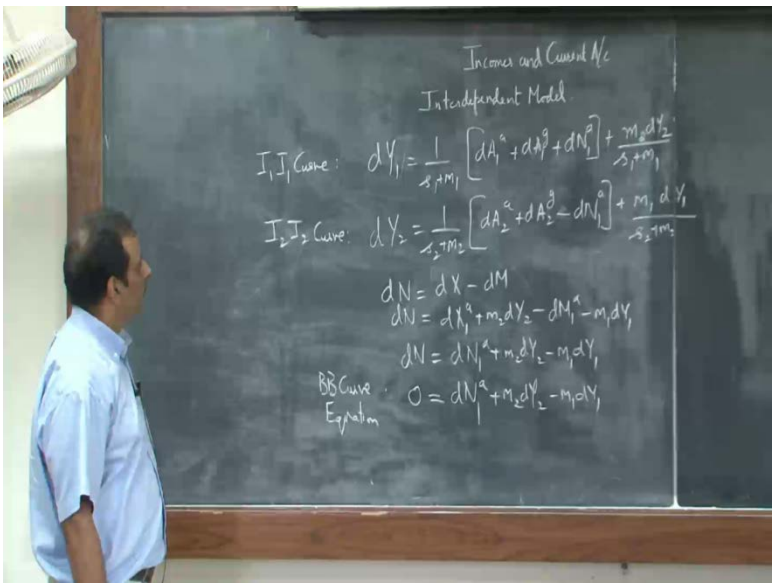
Department of Humanities and Social Science

Indian Institute of Technology, Kanpur

Lecture No. # 04

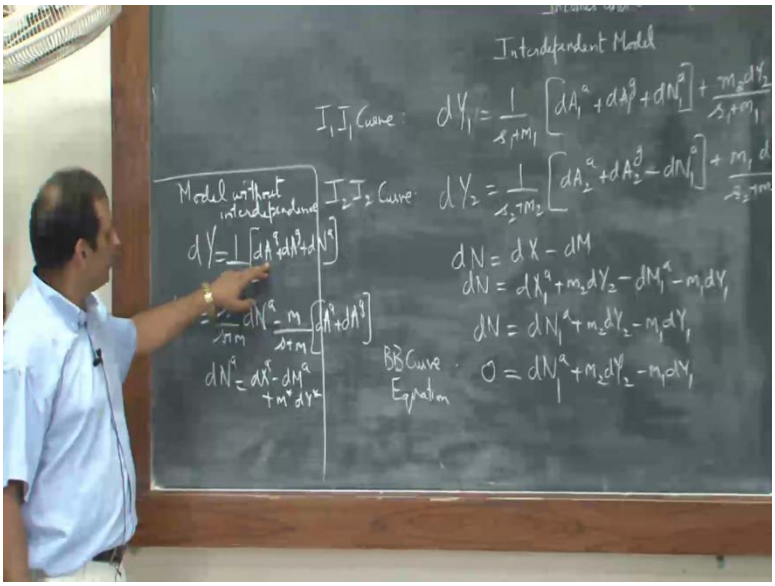
Good afternoon. Today, we will carry forward our discussion on the interdependent model. The issue was that any shock which is given in the system, leads to the changes in the incomes and in the current account balance. And the shocks leads to the changes in current account balance, which are sustained even in the interdependent model. And this is what we are going to see, this set of equations, we derived last time. Here, we have two trading partners. And d Y 1 denotes the changes in income for the first country, as a function of the expenditures including the changes in the autonomous net exports. And it is also a function of the changes in incomes in the second country.

(Refer Slide Time: 01:21)



Similarly, d Y 2 the change in income in country two, is a function of the expenditures including the changes in net exports, and the changes in incomes in the first country. Had it been a model without independence? In that case…

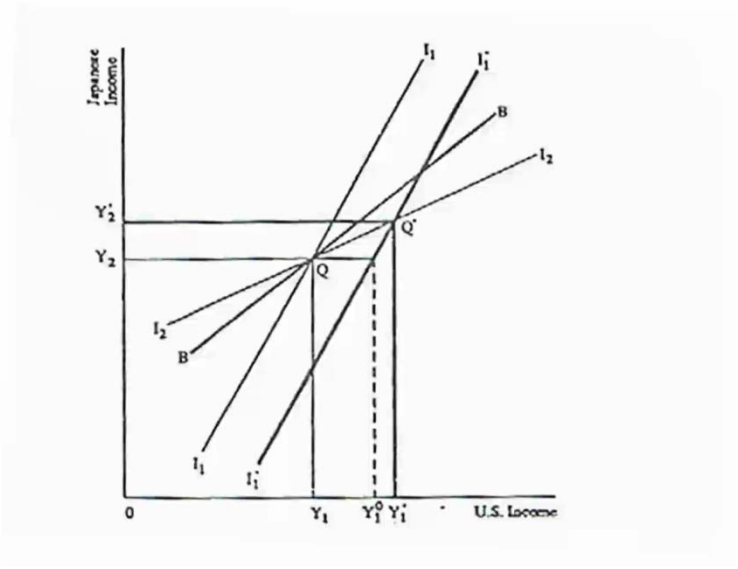
(Refer Slide Time: 02:15)



(No audio from 02:17 to 02:59)

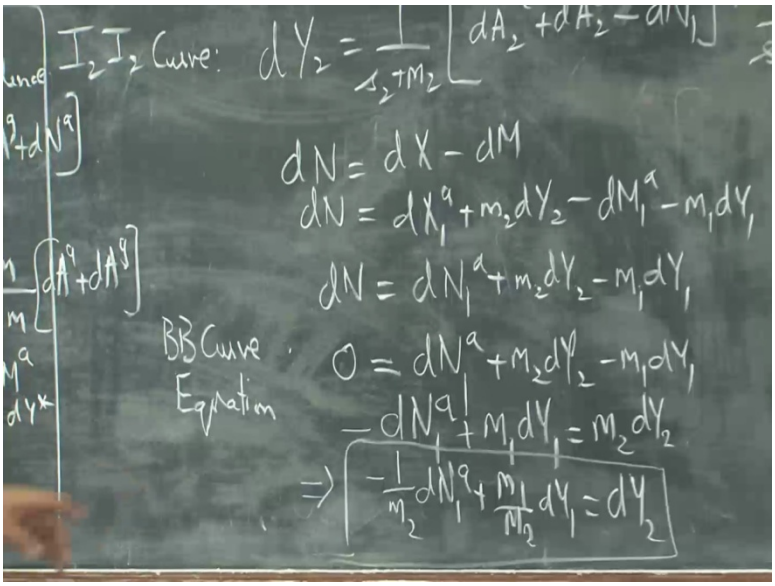
In that case, a model without interdependence, you see that, the change of income is directly related to the expenditures, and the autonomous change in net exports, which is defined in this manner. And the changes in net exports is directly related to autonomous change in net exports and the expenditures. Now, see the difference between the interdependent and the dependent model, that if there is an increase in the expenditures, it leads to the changes in income through the open economy multiplier. But in the interdependent model, there is something else which is happening. When these expenditures go up, they tend to increase, not only the incomes in the first country, but they also tend to increase the incomes of in the second country. Because, expenditures tend to have an impact on the incomes of both the countries, so, if incomes in U S, if the expenditures in U S go up, the incomes in both U S and Japan goes up. And when the income in Japan goes up, their imports go up; it means U S exports go up. And when U S exports go up, it impacts the incomes in the U S.

(Refer Slide Time: 04:57)



So, in an interdependent economy, your open economy multiplier increases, you have a larger impact on the incomes. Now, this point is depicted through a diagram. If you have collected the notes, this is, if you look at the handout page 340, you have 3 lines, one is the I 1 I 1 line; the other is the I 2 I 2 line, and the third is the BB line. The I 1 I 1 line is a reflection of this equation, where the slope of the I 1 I 1 curve is m 2 divided by s 1 plus m 1. The I 2 I 2 curve which has a lower slope, is a reflection of this second equation, whose slope is given by m 1 upon s 2 plus m 2. There is another line which is B B line, which denotes, which is a reflection of this BB curve, which shows all combinations of U S and Japanese incomes, wherein you have a current account balance.

(Refer Slide Time: 06:49)



In other words, when d N is equal to 0, and you have a relationship between incomes of the U S and the Japan, you get the BB curve. So, if you solve it further, you would get minus d 1 a plus m 1 d Y 1 is equal to m 2 d Y 2. So, d Y 2 is minus 1 by m 2 d N 1 a plus m 1 by m 2 d Y 1 is equal to d Y 2. So, your BB curve is a reflection of this equation.

Now with any equation that you have, if there are changes in the autonomous components, then you see a shift of the curves. So, say for example, if there is an increase in expenditures, if there is an increase in expenditures, the incomes in the first country would go up. Now, this would mean that the I 1 I 1 curve given the Japanese incomes, you would see a rightward shift of the I 1 I 1 curve. So, given that the income of Japan remains the same, if the expenditures in U S goes up, then the incomes in the U S goes up. This means, that there will be a rightward shift of the I 1 I 1 curve.

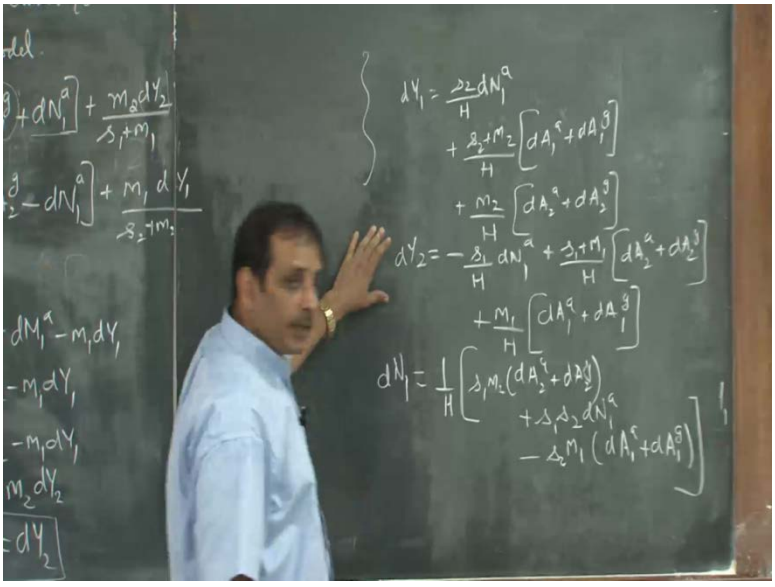
If there is a change in, say this component, which is the autonomous component. If there is an increase in this, please see what happens. The incomes in the U S increases, again there will be a rightwards shift. But look, what happens to the d Y 2 curve, if d N 1 a goes up, the d Y 2 term declines. So, given the incomes, given d Y 1, if you see that d Y 2 has to go down, then the I 2 I 2 curve will shift to the right. And then this autonomous component, if there is a change in the autonomous component, this also brings changes

in the BB curve, because if d N 1 a goes up d Y 2 terms goes down. So, the B B curve also shifts to the right, given the U S incomes.

So, let us see an analyze, at least two cases. One is an autonomous increase in U S expenditures in a two country world. So again you can easily see that, if d A 1 a or d A 1 g changes, it increases it tends to have an impact on the I 1 I 1 curve. The I 1 I 1 curve shift to the right. So, the equilibrium point is q dash, a movement from q to q dash, and this is a point which lies below the B B curve. Remember, the B B curve is a reflection of this, where all points shows the current account balance. So here at q dash, if it is below the B B curve, you would see a current account deficit at q dash.

Let me explain this point, you can see from this equation, and also from the equation, a model without the interdependence. Any increase in expenditures tends to raise the incomes, but it also tends to have an impact on the current account balance, which goes into deficit, because as incomes increases the imports go up.

(Refer Slide Time: 12:06)



So, you have a current account deficit. Even in the interdependent model, even if the expenditures go up, incomes in both U S and Japan goes up. So, increase in Japan's income leads to an increase in imports and increase in exports. And a minor adjustment to the current account balance of the U S, which has fallen into the deficit, because of the increase in expenditures. So, there is a minor adjustment, but still you see a current account deficit, because of the initial shock which is which are given. So, even in the

interdependent model, it is not able to completely wipeout the deficit which is created by an increase in the expenditures.

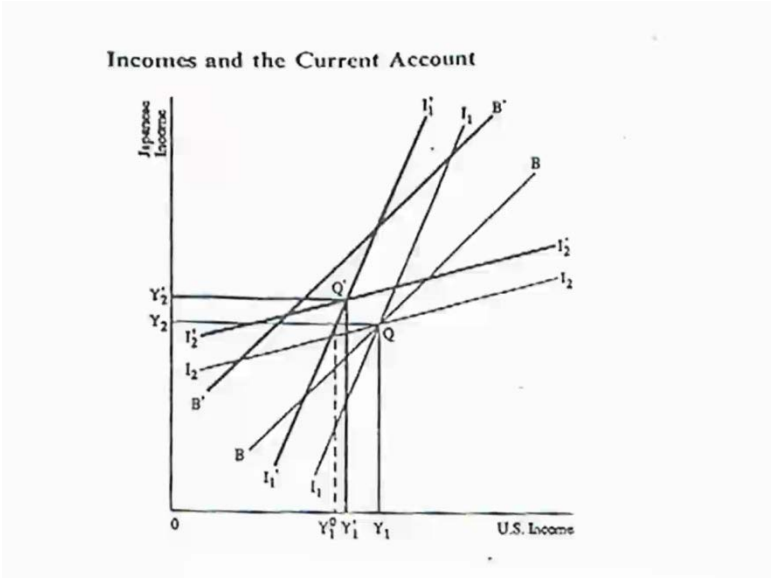
Now, you can see this BB curve, any point which is say above BB curve, you would see that you would have higher Japanese incomes. Higher Japanese incomes would lead to higher imports; higher imports leads to higher exports. And therefore, any point above the BB curve will be a current account surplus, any point below the BB curve will you will have a current account deficit.

So, this diagram shows that two things. One that if you do not have an interdependent model, and there are increase in expenditures, your incomes will increase from Y 1 to Y 1 0. You see that in the, if you consider a changes in expenditures, it tends to have an impact on the U S incomes, but U S incomes only increase from Y 1 to Y 1 0. In an interdependent model, the open economy multiplier becomes larger, and therefore the incomes rise from Y 1 to Y 1 dash, not Y 1 0. And the reason that, I explained is that in an interdependent economy, when your expenditures go up, your incomes go up, their incomes also go up. When their incomes go up, their imports go up. When their imports go up, our exports go up. When our exports go up, they tend to have a impact on the incomes.

So, the increase in income is larger, in case of an interdependent economy. But as I said it is not able to completely wipe out the deficit which is created, because of the shocks which are given in the economy. Look at the model without interdependence, if d I a plus d I g if this goes up, it leads to a current account deficit. Because when the expenditures go up, incomes go up, imports go up; when imports go up your current account falls into deficit.

Now bring in another economy, if expenditures go up, your incomes go up, their incomes go up. your exports go up, but that is not able to wipe out the deficit which is created by the increase in the expenditures. Now look at the other handout, which is page 342 of the peter b keen's book, it seems that they are it is a complicated diagram.

(Refer Slide Time: 16:12)



But if you are clear on what is the I 1 I 1 curves equations, the I 2 I 2 curves equations and the BB curve equations, you will not have any difficulty in understanding the diagrams. Again there is an I 1 I 1 curve depicting the first equation, the I 2 I two curve depicting the second equation, which shows relationship between their incomes and our incomes and you have the BB curve which shows the current account balance.

Now, the shock which is given.

(( ))

In the first case, the I 2 I 2 will not shift because I 1 I 1 curve is this, I 2 I 2 curve is this. So, you can see that d I 1 a and d I 1 g is not here in the second equation, but when you solve for this; that means, if you are talking of that point q and q dash. Do you see the point q and q dash? That point q and q dash in the first handout; that is page three forty that is a reflection of those d Y 1 and d Y 2.

But if the I 1 I 1 curve is a reflection of this. so, coming back to.

(( ))

See please recall that, for an equation of a straight line you have a plus b x. So, if there is a change in a, it means that the curve will shift, and if b changes, you move along the curve. So, if this would have change, then you would have moved along the curve. The

slope would have change. But here the intercept changes, and this does not have the second equation does not have d I 1 a and d I 1 g.

Now, coming back to this point, an autonomous switch in expenditure from home to foreign goods. Now what do you think will happen to the first equation. Please see the d N 1 a term is the autonomous changes in net exports. Now there is a switch in expenditure from home to foreign goods, what do you think will happen to the d N 1 a term. If there was a switch from foreign to domestic goods, then what would have happened to d N 1 a term.

Instead of liking goods from abroad, if you start liking your own goods, what would have happened to d N 1 a. It would have increased because your imports would go down. What would have happened, if there is a switch in expenditure from home to foreign goods, the d N 1 a terms goes down. So, what do you think will happen to the incomes, here it goes down.

So, when the incomes go down given that the Japanese incomes remain the same, you would see a leftward shift of the I 1 I 1 curve, and that is what happens the I 1 I 1 curve shifts leftwards. But that is not the end of the story, because d N 1 a term is also present here and when the d N 1 a term goes down and there is a negative sign here, the d Y 2 term goes up.

Now, given d Y 1 d Y 2 term goes up. So, if the d Y 2 term goes up, please see that the I 2 I two curve given the U S income it shifts upwards or shift to the left. And then there is a third thing happening, there is also the BB curve equation, which has a d N 1 a term and when the d N 1 a term goes down with a negative sign here the d Y 2 term goes up. So, when the d Y 2 term goes up with the given U S income, see what happens to the BB curve, it also shifts upwards. Because, if you look at this and I will give you the economic reason also, but look at this when the d N 1 a terms goes down when there is a deficit here. So, d N 1 a term goes down here and there is a negative sign here.

So, you have a negative sign and this goes down. So, the change is negative and there is a negative sign here. So, this goes up. So, when d Y 2 goes up with the given level of income, Y 1 is the U S income and d Y 2 term goes up. So, the I 2 I 2 curve shifts up. And the economic reason you are already aware that, if there is a deficit autonomous change in net exports which goes down, it leads to a decline in incomes. When this goes

down, there you have an autonomous increases. When you have a deficit, they have a surplus. When they have a surplus, their incomes go up that is what happens, the d Y 2 terms goes up. But then the initial deficit which is created is not been able to be wiped out, even in case of an interdependent economy.

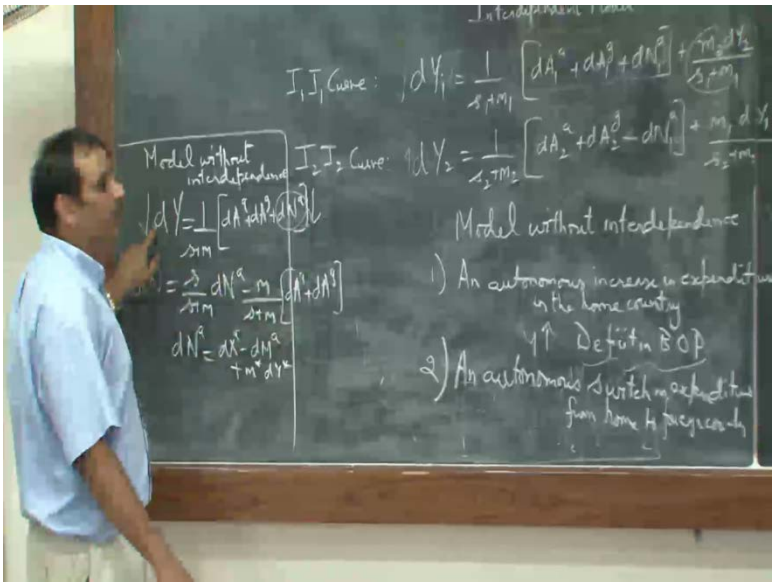
So, you would still see deficit happening, because the new equilibrium point which is q dash lies below the b dash v dash curve. So, you still see a deficit, even in case of the interdependent economy.

(( )).

Absolutely, because this is the curve that we have defined, this is the notation should have had 1 d N 1, this is all d N 1 d N 1. So, we are talking of this.

So, that is the point that, I was trying to explain that even in the interdependent economy, the current account deficit or surplus which is been created because of the shocks is not been able to be wiped out even in case of the interdependent economy . So, then the question is that, how do we remove surplus or deficits permanently. Even if these surplus and deficits are not being removed in the interdependent economy, then what do we what can we do to remove the deficits and surpluses in the balance of payments.

(Refer Slide Time: 24:44)



So, let us discuss the first case, this is again a model without interdependence. So, we are back to the one economy world which is this, where the changes in income is directly related to the expenditures and the autonomous change in net exports. And the current account balance is directly related to autonomous change in net exports and the expenditures. The first shock is an autonomous increase in expenditures in the home country.

Now to analyze this, let me define two things which are internal and external balance. There is something like the internal balance, which is the full employment level of output. If the output exceeds the full employment level of output, you see an inflation. If the output falls below the full employment level of output, you would see an unemployment in the economy.

So, this is one point, wherein all people who wish to work they get employed. You have price stability. But anything beyond this, would lead to inflation and anything below this, would lead to unemployment in the economy. This is called the internal balance. And then there is something like the external balance which means that, there is a balance of payment equilibrium. How do we have a balance of payment equilibrium, please recall that, if the sum of the autonomous receipts of foreign exchange is equal to the sum of autonomous payments of foreign exchange. Then you have a balance of payment equilibrium. This can also be analyzed, if you assume that there is a current account which falls to 0. If the current account is 0, then you can have a balance of payment equilibrium. If the current account balance is zero means the capital account balance will also be zero.

So, think of the external balance as the balance of payment equilibrium, wherein you do not have any deficit or surplus in the balance of payments. You are back to model without interdependence, and your objective now is to curb any deficit or surplus in the balance of payment. Reason being, that even if you had a model with interdependence any shock is not able to curb the deficit or surplus permanently.

So, we have to do something more in the economy to curb the surplus and deficit. Now see, what happens if there is an autonomous increase in expenditures in the home country. How it impacts the internal and the external balance. Given a model without interdependence, you already know that if the expenditures go up, the incomes go up. So,

your internal balance gets affected, you see an inflation in the economy. But then the increases in expenditures also tend to deteriorate your current account balance. So, you see deficit in the balance of payment.

So, you are out of internal balance, you are out of external balance, point is, what you should do to bring back your economy, back to internal and external balance. So, to answer that there the answer is to cut back the expenditures, may be policy induced expenditures. Because, that will bring the economy back to internal and external balance. Now you would appreciate this point, if someone instead of using the expenditure changing policies, uses the expenditure switching policy.

Now you already seen that, when this happens the incomes go up and there is a deficit in the balance of payments. And if there is a novice who is sitting in the ministry and he has with him an instrument which is a way to switch expenditure to curb the deficit, see what happens if he only focuses on the external part, and he wants to curb the deficit in big balance of payment, he will switch expenditure from foreign to home goods. Is not it? So, when you do that, you can take care of the deficit in balance of payment. But never realizing when you switch your expenditure from foreign to domestic good, see what happens to the d N 1 a term. When there is a switch from foreign to domestic good your d N 1 a term goes up, your incomes go up. Your incomes had already increased before hand, because of the shock.

So, you achieve external balance, but you move further away from your internal balance. So, expenditure switching policies is or not the right policies, in case there is an autonomous increase in expenditures. Only expenditure changing policies are appropriate from national point of view, to bring back your economic equilibrium back to equilibrium, that is you should you achieve internal and external balance. Again if there is a novice who is sitting, and he wants to take care of the increase in incomes. What do you think; he can do to curb that increase in incomes.

If the instrument that he has with him is to switch expenditures, how can he take care of the increase in incomes? He can take care of the increase in incomes, if he concentrates on this term, and if this term goes down it would lead to a decline in income. And how is this possible? How can the d N a term go down, if there is a switch in expenditure from home to foreign goods, then only d N a term would go down.

So, when this goes down, he feels relieved that at least he has taken care of the changes in income. But when this goes down, it would further lead to a deficit in the balance of payment, you move further away from your external balance. So, the message is that, if there is an autonomous increase or decrease in expenditure, you adopt expenditure changing policies to take care of your internal and external balance.

Second, an autonomous switch in expenditures from home to foreign country. Now, you know what will be the impact, if there is an autonomous switch in expenditures from home to foreign country. If an Indian starts liking goods coming from abroad. So, what will happen is that, it will have an impact on the d N a term this would go down, incomes would go down. So, you have incomes going down, and you have a deficit in the balance of payments. What do you think should be the appropriate policy to take care of the switch in expenditures, which has taken which has taken place from home to foreign country. What should the policy maker do, to achieve internal and external balance. Should they adopt expenditure changing policies? Or should they adopt expenditure switching policies?

So, to answer that, if there is a switch in expenditure, you adopt the expenditure switching policies. You shift back from foreign to home goods. So, if you switch your expenditure from foreign to home goods, you can see that you can bring your economy back to equilibrium. Your internal and external balance can be brought back to the equilibrium.

Again think of a novice who is sitting in the ministry, instead of using the expenditure switching policy, he focuses on expenditure changing policy. There is an income decline; he wants to take care of this internal balance. What will he do, he sees a decline in the incomes. So, the option if he has an instrument which is expenditure changing policy, he would increase the expenditures in the economy. Because he knows that if the expenditures go up, the incomes go up.

So, he can take care of the internal balance, but never realizing that when the expenditures go up, this you have a current account deficit, you move away from your external balance. You may achieve internal balance, but you move away from your external balance. Again, if he uses the expenditure changing policies to take care of the deficit, then he will reduce his expenditures. When he reduces his expenditures, he may

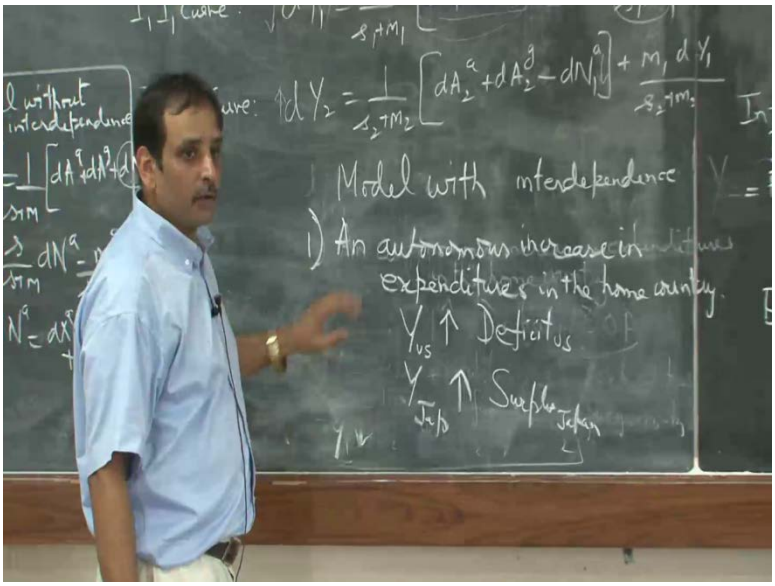
be able to take care of the balance of payments. But when it comes to the internal balance, as soon as it decreases the expenditures, his incomes go down further he moves away from the internal balance.

So, the message is that, if you have to permanently deal with deficit and surplus in an economy without interdependence, if there is an autonomous increase or decrease in expenditures, you adopt expenditure changing policies to bring back your economy back to internal and external balance. And if there is a autonomous switch in expenditures, you switch back your expenditures to bring back your economy into internal and external balance.

In the next class, we will see that how you switch your expenditures. In fact, when you depreciate your economy, you switch your expenditure from foreign to domestic goods. Because, your imported price goes up in terms of Indian rupees, your export price in terms of the foreign currency goes down. So, you switch your expenditure from foreign to domestic goods. And when you appreciate your currency you switch your expenditures from domestic to foreign goods, because your import prices goes down, your export prices increases in terms of foreign currency. So, you switch your expenditure from domestic to foreign goods. And that we will see in the next few lectures.

I will end up with a little complicated case of a model, wherein you have interdependence, and then you have an objective of how to achieve the internal and external balance. So, you have model with interdependence and again a shock comes, the shock is an autonomous increase in expenditures in the home country.

(Refer Slide Time: 38:32)



So, it is a little bit complicated case, because (( )) complicated because here the home country decides to do nothing. You already know that, when there is an autonomous increase in expenditure, the appropriate policy from both national and global point of view is to decrease the expenditures in the home country. Now when I say appropriate policy from national and global point of view, I am bringing in what happens in the foreign country.

Now remember, when there is an autonomous increase in expenditures in the home country, incomes in U S goes up, there is a deficit in the current account balance in U S. But there is something which happens in Japan also, because the expenditures have gone up, incomes in Japan go up, and because there is a deficit in the U S. There will be a surplus in Japan, this is the entire effect of an autonomous increase in expenditures.

So, both countries move out of their internal and external balance. So, when I say the appropriate policy from national and global point of view would be again the same, that if there is an autonomous increase in expenditures, you reduce your expenditures. When you reduce your expenditures, your incomes go down, deficit comes back to equilibrium. Their incomes go down, the surplus is curbed, because when the deficit becomes 0 in the U S, the surplus also becomes 0 in Japan.

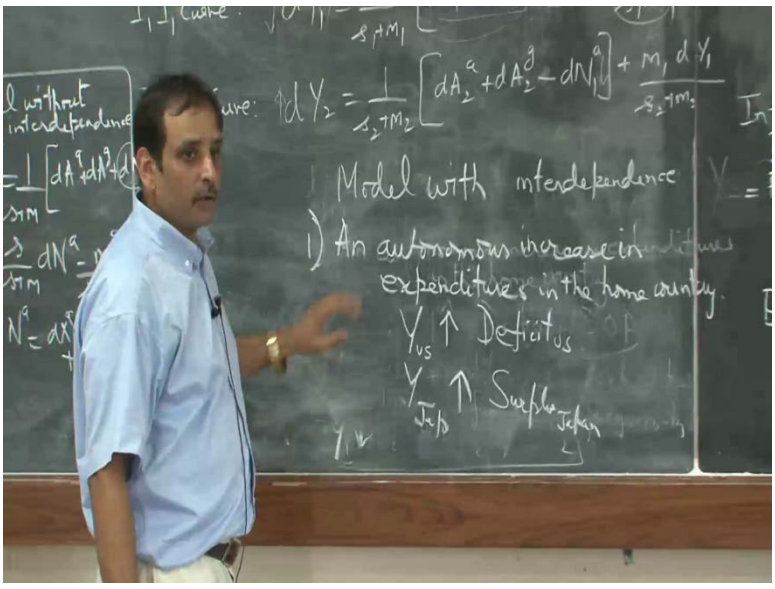
So, the appropriate policy is again expenditure changing policies in the when you have an autonomous increase in expenditures in the home country, again think of this person

who does not know this rule, does not know the optimal pairing of the instruments with the targets, and he tries to use the exchange rates .The changes in exchange rates to either look at the deficit in the U S or look at the ways, and means to counter the increase in incomes. Now if there is a deficit in the U S, he will switch expenditure from foreign to domestic goods.

So, (( )) what happens if he depreciates his currency in the hope that he curbs the deficit in the balance of payments what do you think will happen he will be able to curb the deficit because he has switched expenditure from foreign to domestic goods, but that has an impact on the incomes because as d N 1 at when he when he switches his expenditure from foreign to domestic goods the incomes in the economy go up when the incomes go up when the incomes go up you move further away from your internal balance what do you think will happen in Japan if there is an autonomous switch in expenditure here from foreign to domestic goods.

So, deficit can be taken care here and. So, will be the surplus there, but then what will happen to them to the incomes. If this improves, if this d N a term improves, incomes go up, but when d N a terms improve, it deteriorates there. So, the incomes, there goes down and this is also taken care a switch in expenditures will not be able to take care of the internal and the external balance in the in the U S economy.

(Refer Slide Time: 43:52)



So, the appropriate policy is the expenditure changing policies quickly on the second point again. So, what will happen if there is an auto switch in expenditure from home to foreign country what do you think will happen in the economy there is a deficit in the balance of payment absolutely right and when there is a deficit remember the incomes in the U S goes down. So, the appropriate policy in this case is to switch back your expenditure from foreign to home goods right and say for example, if U S decides to do nothing. So, remember when you move your expenditures from foreign to home goods you are depreciating your currency, but the others when you depreciate they appreciate ok.

So, either you can depreciate your currency, or if you do not want to do anything, you would expect that the other country would appreciate their currency to bring back the economy back to equilibrium. So, the appropriate policy is switching back what would have happened. If he had adopted expenditure changing policies, now there is a deficit here and the incomes have come down. What would have happened if he wants to take care of the deficit, he would reduce expenditures? This will take care of the deficit, but again when you reduce expenditures, your incomes would go down. What would have happened if he had taken care, if he wants to take care of the decline in the U S incomes, he would increase expenditures, but increasing expenditures would mean again a deficit in the balance of payment of this country.

Now, I want you to understand this point that, when he increases the expenditures. Please think what happens in Japan, when he increases expenditure here to take care of the internal balance. It leads to a deficit here, but think what happens in Japan. In Japan, because of the increase in expenditures, their incomes go up right. And when their incomes go up, see what happens to the surplus, which is created because of this shock when the incomes go up the imports go up.

So, there surplus gets reduced. So, this policy of the U S, which is increasing expenditure can take care of your internal balance, but not the deficit it is altruistic in the sense that, it takes care of both internal and external balance in Japan. Because the increase in expenditure increases incomes there, and it also takes care of the surplus which was created because of the deficit in the balance of payments.

So this is a case, where your policy altruistic, it is not good for you, but it is good for Japan. So all this, which what I am saying can be analyzed through the equations. I want you to go back and then have a look and read the relevant chapter along with, what is there in the appendix. Because all the equations are there in the appendix, so, we stop here, and then we will move to the other chapter on capital account and the elasticity approach to balance of payment in the next class.