International Economics

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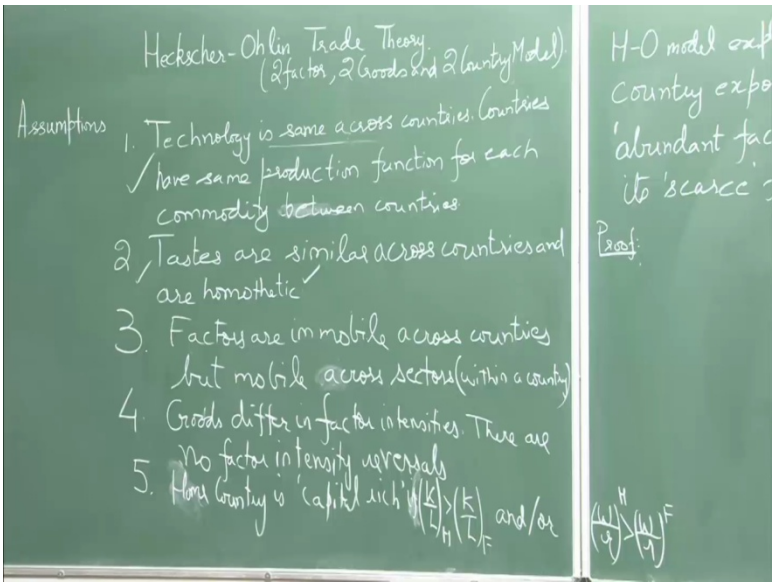

Good afternoon, today we are going to talk about the Heckscher-Ohlin trade theory. This is the new classical trade theory, the first attempt was done by professor Heckscher working in the Lund University in Sweden, South of Sweden, and then subsequently his student after a 10 year gap worked on his P H D on the regional trade in Europe. They were the ones who propounded the most famous of the trade theories till Krugman contested the the H O Heckscher-Ohlin trade theory.

So, well couple of assumptions which are required different from the Ricardian model where in the Ricardian model, you had a technology which was different across countries. And technology was defined in terms of relative factor productivities, and all other things were same. Here one of the main assumptions is that technology is same across countries, which may be valid in today's context with the with the I T boom and internet technologies all over.

I think it is not a bad assumption to say that technology is same across countries, but if you have to explain the empirical facts of international trade, then at the end you would see that Heckscher-Ohlin can explain the empirical facts of international trade, only if a relax this assumption that technology is same across countries. So, on the one hand I am saying that it is not a very bad assumption to make in today's context because with our internet boom and IT technology. The technologies can really travel across countries and you get to know, what are the new developments? But on the other hand the empirical facts of trade which are say most of the trade takes place among industrialized countries, it takes place among countries which are closer to each other.

These facts cannot be fully explained by the Heckscher-Ohlin theory. An Heckscher-Ohlin theory explains trade in products which differ in factor intensities, but the third empirical fact of international trade is that most of the trade is intra industry trade. Trade in products which have similar factor intensities, Heckscher-Ohlin cannot explain trade taking place among goods which are same.

Germany exporting one type of car importing another type of car, the Baltic states exporting one type of modem importing another type of modem. One country exporting one type of printer importing another type of printer, Heckscher-Ohlin cannot explain trade in products which have similar factor intensities. So, the empirical facts of international trade are that most of the trade takes place among industrialized countries; it takes place between countries which have common borders, have a smaller distance between them.

And third most of the trade is intra industry trade, Heckscher-Ohlin cannot fully explain all these three empirical facts of international trade, but now the latest research is on that if you relax this assumption that technology is same across countries, then you can explain some proportion of international trade taking place between countries. And so, then people also start question that if you relax this assumption then it is no longer Heckscher-Ohlin, it is like the Ricardian type of trade.

So, then people are now refocusing their attention on the Ricardian theory that because Ricardian theory is the one which says trade takes place because of differences in in technology, but Heckscher-Ohlin you will see that, it is intellectually quite rich, I mean if

you if you see the assumptions and you see the proof. The proof will be very neat and you will get the desired results.

So, you have technology which is same across countries and when I say technologies it means that you have this production function, which will be a function, say x is a function of k and l, in both the countries and y is a function of k and l in both the countries. It is in that sense that you say that the technology is same across countries. Tastes are similar across countries. So, it will be reflected in the same indifference curves for both the countries and they are homothetic, homothetic would mean the proportion of consumption will remain the same. So, you may be richer, but c by y ratio will be the same across countries. That is what you mean when you say it is homothetic.

In mathematical terms, the income elasticity of demand if it works out to be one, then you say that the tastes are homothetic. So, tastes are similar and homothetic and this assumption is required to prove the Heckscher-Ohlin trade theory. If you use the abundance, if you use one of the definitions of richness that is k by l, h is greater than k by l f. To prove Heckscher-Ohlin using this definition of abundance you require that the tastes should be similar across countries and should be homothetic.

Factors are immobile across countries. Now, this is one big assumption because we are talking about the economy Heckscher and Ohlin were talking about economy when the world war one had just happened and if every country had put lot of protectionist measures. So, they are talking about economies where factors are immobile across countries. So, as an individual if you find higher wages outside your country, then this theory assumes that you are immobile, but you are mobile between the sectors and the beauty of this is that you will see that trade becomes a substitute for the movement of labour and capital.

So, at the end you will see that this Heckscher Ohlin, one of the offshoots of Heckscher-Ohlin is that with trade the relative wage rate equalizes across countries. So, remember whe so, trade becomes a substitute for the factor movements. Now, remember if you have higher wages in one country and if you have lower wages and if there is free movement of labour, then the labour from here would move here and at the end what will happen will be that the wages would be same across countries. Now, this theory is

predicting that if you trade between countries across countries the wages will become equal, the rate of return on capital will become equal.

So, trade becomes a substitute for the movement of factors that is one of the real beauties of the Heckscher-Ohlin trade theory. Then, and because and they are mobile across sectors that means the wages are same within a country, the rate of return on capital is same within a country, because factors can move freely within a country. Goods differ in factor intensities. So, one good is capital intensive another good is labour intensive. Capital intensive means k by l ratio in the production of x is greater than k by l ratio in the production of y.

So, they differ in factor now this is what a Krugman was contesting that Heckscher-Ohlin is a theory which can explain inter industry, not intra industry trade, trade in goods which are similar in factor intensities, Heckscher-Ohlin cannot explain the intra industry. It explains the inter industry trade, that is trade in goods which differ in factor intensities and there are no factor intensity reversals. That means, with low and high relative wage rates one good will always remain capital intensive, another good will always become will be a labour intensive good like in US agriculture is considered to be capital intensive, and in India agriculture is labour intensive and there. So, at a different relative wage rates one good which was labour intensive becomes a capital intensive.

We dispense with such possibilities, we say a different relative wage rates, one good will always remain capital intensive, another good at different relative wage rate will always become will always be labour intensive this is called no factor intensity reversals and if there are factor intensity reversals then you will see that at least in one country the Heckscher-Ohlin result will not follow, will not hold. Then they define capital rich as and so, it is a two factor two goods two country model. You you you can extend it to three factors, three goods the real the real world things will become little complex and in that context there is something called the Heckscher-Ohlin Vanek theorem H O v H O v.

So, one of my P H D scholar works on the on this that what happens if you increase the number of factors, increase the number of goods, increase the number of countries, how do you then explain what is capital rich, here you define capital rich as k by l by h greater than k by l by f and or w by r ratio at home greater than w by r at foreign. So, this is how you define, it is easy to define it in a in a simple model of 2 into 2 into 2.

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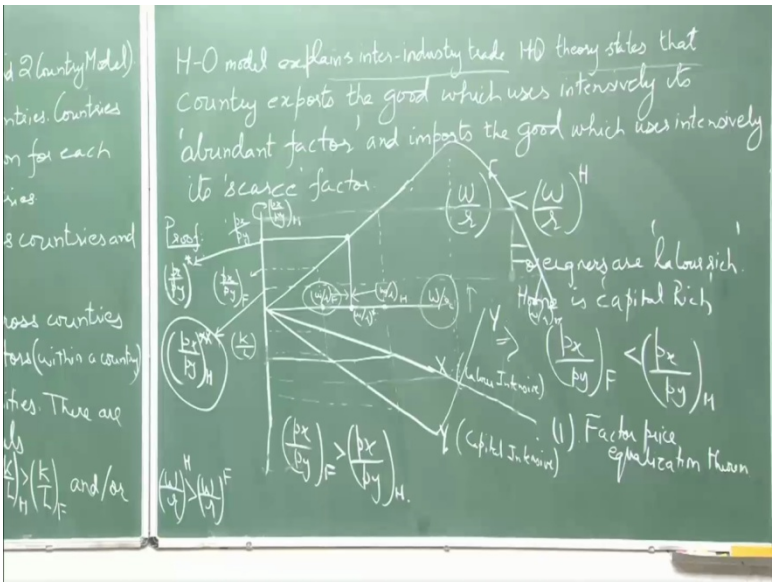

So, then this is what H O model says, it explains inter industry trade and H O theory states that country exports the good, which uses intensively the abundant factor and imports the good which uses intensively it is scarce factor. In crude form countries which are rich in capital will export capital intensive goods countries, which are rich in labor will export labor intensive goods.

So, here please recall a country has a comparative advantage in the production of a good if it can produce a good at a lower relative price. Now, this theory is saying that you have a lower relative price because you are you have an abundance of certain factors. May be you are you are abundant in human capital. So, if you work this out for India you will see a very peculiar thing, India is rich in human capital, it is rich in semi skilled, it is rich in unskilled workers.

So, when people start researching India's data they find this peculiar thing. So, India exports human capital intensive product, labor intensive manufactures, which is like a middle skill intensive and then unskilled labor intensive products. What India is lacking is the R and D intensity research and development expenditure as a percentage of g d p, R and D is a minimal of what happens in the outside countries. So, we may be exporting this human capital intensive product, but we are surely importing r and d intensive products from outside.

Sir, Ricardian theory also says something like this about comparative about countries having comparative advantage.

Absolutely all countries have the same. See the concept of comparative advantage is the same that you can produce a good at a lower relative price, there in the Ricardian model you have a lower relative price because you the relative factor productivity of that particular sector is greater than, the relative factor productivity of that sector in the foreign country, relative factor productivity and Ricardo defines technology in that sense.

So, then now I will give the proof and the proof will take two definitions of factor abundance. One is this definition that one is capital rich if k by l and h is greater than k by l and f and the other is that foreign is labor rich if w by r ratio in foreign is lower than the w by r ratio in home. So, let us see diagram (No audio from 16:50 to 18:15) So, this is a diagrammatic exposition of the Heckscher-Ohlin model. What you need is a one to one relationship between the relative wage rates and the relative price of x and y, p x by p y where x is a labor intensive product, y is a capital intensive product and one to one correspondence between relative wage rate and the capital labor ratio.

Now, see this relationship if there is an increase in relative wage rates, it increases the relative price of the of the labour intensive good p x by p y there is a direct relationship because x is a labour intensive product. So, naturally when x uses more of labor and the relative wage rate goes up p x by p y ratio goes up. So, there is a there is a one to one correspondence between p x by p y into w and w by r, and one to one correspondence between w by r and k by l if you increase w by r you employ more of capital in both the industries.

Now, you can also see that when w by r is increasing x will always be labour intensive and y will always be capital intensive. There are no factor intensity reversals at different wage rates x would always be labour intensive, y would always be capital intensive. See here, it uses less of k by l, y uses more of k by l. Now, the only thing for the proof is that you need to assume, that the w by r ratio in foreign is less than the w by r ratio in home. So, foreigners are labour rich and home is capital rich and labor rich and capital rich is defined in terms of the relative wage rate relative wage rates.

So, w by r in f is less than w by r in home if that is so w by r in f is less than w by r in h, this would mean this would mean p x by p y in foreign would be less than p x by p y in

home. So, f will have a comparative advantage in the production of good x, y h h will have a comparative advantage in the production of good y.

So, if f has a comparative advantage in the production of good x, f will export good x right and h will export good y, f being labour rich exports It is labour intensive product home being capital rich exports its capital intensive product hence the proof as simple as that that is the proof. So, then if you go into the mathematics the mathematics will first prove a direct relationship between relative wage rates and prices. It will show you a direct relationship between relative wage rates and capital intensities, then what it will do before bringing trade it will say relative price is a function of so many factors on the right hand side and then from all that what will come out is this that there is a direct relationship between p x by p y and w by r and w by r and k by l.

Now, look at the off shoots of the Heckscher-Ohlin model which is the first is the factor price equalization theorem. So, then think of a situation after trade what happens after trade. So, this country is labour rich, it exports good x. So, it starts producing more of x, when it starts producing more of x, it would require more of labour, but more of labour is not fourth coming from the decrease in production of good y. So, the relative wage rates go up the prices rise.

So, then the relative wage rates increases with a increase in production of good x in home you increase the production of y. So, r by w ratio goes up or the w by r ratio goes down and then eventually they meet such that, you have a common relative wage rates which will determine the common relative prices. This is the international price at which the countries would trade this is the same price which is determined. When import demand curve and foreign export supply curve they intersect with each other and you get a point where world demand is equal to world supply, but this is also a point where the relative wage rates would be equalized.

But then what needs to be seen is that the cone of diversification for both the countries should coincide. Now, here I am bringing something little technical cone of diversification should coincide for the factor price equalization. What is cone of diversification? Cone of diversification is that if you have a capital labour ratio in your country, you can use that capital labour ratio to produce only y or only x or you divide it

between two goods in such a way that some is used for production of x and some is used for production of y.

So, then your relative wage rates will move in this region from this to this. It cannot go beyond this, because if k by l is this then, there will be only production of y. If k by l is used only in x it there will be only production of x. So, your w by r ratio in foreign should be between this and this It cannot go beyond that and for foreign. The cone of diversification again would be from here to here. So, the w by r ratio here can vary from this to this only.

Now, when I say that you have a common region, the cone of diversification should coincide then one can predict that the relative wage rates would be same, because if they are very far apart if they are very far apart for example, k by l in home is here. So, y and x so, your w by r ratio will lie from here to here and the w by r ratio here is of the foreign is here. So, even if it moves even if this moves it cannot come beyond this point.

So, the cone of should match in common man's language that the two country should not be very far apart as far as technology is concerned one should not be Bangladesh, another should not be U S. If Bangladesh and U S trades you would not predict equalization of the relative wage rates that is what it means. So, that is one of the reasons that there is a technology is a same across countries. So, that you do not get countries which are far apart. So, the cone of diversification should coincide.

Second point what would have happened if one good which was labour intensive here becomes capital intensive there. So, if you bring in factor intensity reversals. Now, look at this diagram how it will change. This good which was capital intensive now, look at this is a case where you have factor intensity reversals. Now, look at this can you let me know the shape of this. Can you let me know the shape of this p x by p y beyond this point sorry beyond this point. Now, good y has become intensive, good x has become capital intensive beyond this point. So, if w by r ratio increases it will increase the price of the labor intensive good and what is the labour intensive good y.

So, if p y by p x increases, what happens to p x by p y it declines. So, then look at this shape it comes like this. So, these are what happens if you have a factor intensity reversal. So, then, then what? So, you can always have a situation where w by r home is here. So, the p x by p y p x by p y that you get in home is this. So, then p x by p y f is

greater than p x by p y in home. So, then what will happen home will export home will export good x right and remember home was capital rich. So, now, home is exporting good x. And and f exports good y, f which is labour rich exports good y. So, do you see that what happens whether the H O theorem holds or not.

What does H O theorem says? That a country which is rich in capital will export capital intensive product, a country which is rich in labour will export labor intensive product. So, home is exporting good x and what is home? Home is capital rich and its exporting good x here, which is capital intensive product do you do you see this. Now, see this point you are somewhere here, you are somewhere here and look at x has become capital intensive.

So, home x home which is labour rich because w by r f is less than w by r h home which is labour rich exporting capital intensive product in this violates Heckscher Ohlin, but on the other hand the other country the foreigners, which are capital rich they know the foreign which is labour rich, they export a good y here and y is the capital intensive product. So, Heckscher-Ohlin is not holding in one. So, that is what happens when you have factor intensity reversals.

Heckscher-Ohlin will not hold in one of the countries. Then you can always think now, if you have w by r ratio here what would have happened, If w by r ratio was still in this in this section, but then p x by p y would have been here, then you would have seen that it violates this country would have violated the Heckscher Ohlin. Think about I am saying that you are here if you were here w by r is here then your p x by p y is here. So, so p x by p y in home is greater than p x by p y in foreign. Then it would have you would have seen a violation of Heckscher-Ohlin by the foreign country.

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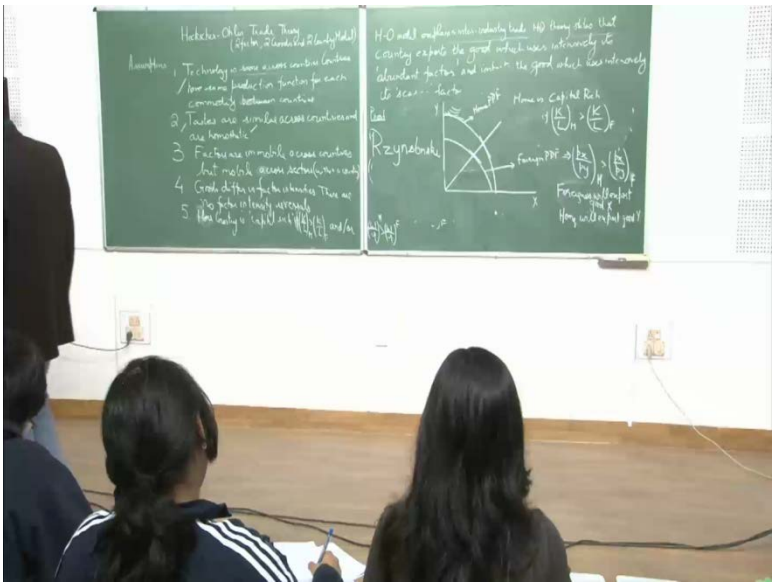

So, this is this is about the factor price equalization theorem and the factor intensity reversals (no audio from 35:05 to 37:01). So, this is proving the Heckscher-Ohlin by the second definition. Which is a capital by labour home is greater than capital by labor foreign. So, you can see the P P F of the home it is more tilted towards the production of good y. Do you see this is home P P F and y being the capital intensive product it is more tilted towards it this is the P P F of the foreign. Now, when you say that the tastes are same and homothetic you are saying that you have the same in difference curve and c by y ratio remains the same across countries. This is also reflected that you would consume on a straight line.

So, if you consume on a straight line and you workout the slope of the P P F at these two points you will get p x by p y in home, which is greater than p x by p y in foreign because remember every as you move from left to right in the P P F the related prices go up. So, this would imply that p x by p y is greater than p x by p y in f. So, then the question comes in the exam. What is required for proving the H O theorem, if you use the physical definition of factor abidance this is the physical definition the other is the factor price definition.

So, here what is required is that the tastes should be similar and homothetic in other words you should consume on a straight line and this is happening if you going to micro economics, if you have income elasticity of demand equal to one you consume on a

straight line. So, then p x by p y is at home is greater than p x by p y in foreign. So, foreigners will export good x home which is rich in capital will export the capital intensive product, foreigners, which are rich in labour will export labour intensive product.

Quick point what happens if tastes are dissimilar if tastes are dissimilar, you can always have a situation where in home you start liking good y and you are here. So, if the tastes are dissimilar compare the relative prices here. So, if p x by p y is less than p x by p y by f home will export good x. So, home which is rich in capital will export labour intensive product, if you have dissimilar tastes. So, then it assumes underline tastes are similar and homothetic if you have dissimilar tastes Heckscher-Ohlin will not hold.

So, there are now, many offshoots of the Heckscher-Ohlin there are two theorems that I would like you to just write. Which is the Stolpersamuelson theorem, Stolpersamuelson theorem and this theorem says a rise in the price of a commodity a rise in the price of a commodity. Raises the real reward of its intensive factor raises the real reward of its intensive factor and decreases the real reward of its uninventive factor. A rise in a price of a commodity raises the real reward of its intensive factor and a decrease in the real reward of its un intensive factor.

There is another theorem that I would like you to just write it is called Rzynsbnski, Rzynsbnski theorem an increase in supply of a factor an increase in supply of a factor. In bracket, parenthesis keeping relative wage rates keeping relative wage rates and factor intensities constant, braket closed. Increases the output of a commodity, which uses the expanding factor increases, the output of a commodity which uses the expanding factor intensively, which uses the expanding factor intensively and decreases the output of and decreases the output of the other commodity and decreases the output of the other commodity. In crude terms the first theorem links the prices of products with the factor prices and the second theorem Rzynsbnski links the factor inputs with the commodity outputs one minute. So, we will end up here and…