Strategic Trade and protectionism Theories and Empirics

Prof. Pratap Chandra Mohanty
Department of Humanities and Social Sciences
Indian Institute of Technology, Roorkee

Lecture – 15
Extension to H-O Theory

Welcome once again to the you know NPTEL module on Strategic Trade and Protectionism, where we have only landed in week number 3, about to complete week number 3 with the last lecture of this which on which is on Extension to H-O Theory. So, far we discuss in detail about H-O theory.

Now, this particular lecture is on just completing H-O theory with certain extension to it. Myself, Dr. Pratap C Mohanty, presently a faculty member in the department of Humanity and Social Science, IIT, Roorkee. So, in this particular lecture, we will certainly try to understand the earlier discussion on Heckscher Ohlin model. Also, we will try to identify the problems with the Heckscher Ohlin model and some of the you know and we will discuss the previous issues as well. We will also try to talk about what are the new additions to the H-O model.

But I think in the last 4 lecture in this week, we discussed H-O theory by examples, by number of you know empirical evidences. Also we discussed you know the criticism to H-O theory with the help of many you know many context like we discuss about Leontief paradox with the help of input output model, we also discussed FIR, Factor Intensity Reversal model, where we already identified the gaps in the H-O model.

So, Heckscher Ohlin model in an (Refer Time: 02:18) suggested, it is a new classical theory as we already pointed out, you know in you know many times in the last week, last to last week as well. So, this new classical theory which actually touches many changes to the classical model and specifically, H-O theory talked about specialization; but the specialization is incomplete and there are possibility of mixed product in the basket of commodities produced by a country and based on the relative advantage again, the country could able to export or import.

Now, H-O theory is on the factor endowments, the endowments actually determine the production function and since it is exhibited with you know increasing opportunity scale of production that lead to incomplete specialization. So, and the product which discuss largely based on the product its and its export to another country based on the resource availability.

Now, question arises though Heckscher and Ohlin both discuss about specialization and import or export based on the resources; but in reality, the countries which have higher resources on its particular product to be produce, but they are net importers rather than exporters identified by input output model in you know Leontief analysis.

Similarly, we also talked about a factor you know FIR, Factor Intensity Reversal model. So, now, what are the other additions to a Heckscher Ohlin theory, so that we can end up these particular lecture in this week, purely specializing on Heckscher Ohlin related aspects.

Now, to have been a further you know clarification on the recent data recent you know evidences of Heckscher Ohlin model, I collected many information from United Nations statistics, based on you know based on the availability of resources. Here, what I found? I observed that you know capital stock as part of endowment we discussed number of times.

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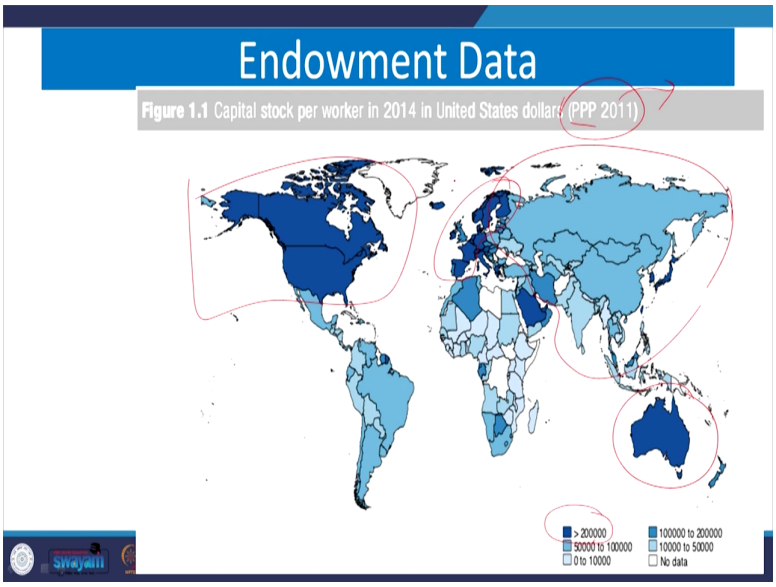

So, the capital stock, how it is determined must be discussed; a capital stock determined by various factor. But here then, extent of capital stock is measured per worker in it is for the latest available report 2014 in so basically in capital stock in 2014 in United States.

I mean in dollar terms, specially, in United States dollar term and also expressed with per capita of you know purchasing power parity, PPP terms. PPP in a figure of or neutralized with 2011 you know data. So, expressed in PPP of 2011 data, which states that now the depth of the color, the bluish color and its depth, determines the magnitude of capital stock per worker in the respective countries.

Now, on the dark blue which is here is greater than you know 200000s greater than 200000s capital stock, 200000 US dollar capital stock is per worker. Now, these are expressed in PPP terms. So, it can be compared with other countries. So, these are not in purely in absolute

numbers. So, these are expressed in purchasing parity numbers. So, therefore, these are comparable.

So, what we observe here that in that United States have huge capital stock, I mean these northern part if you compare with this extent even including India, China, these are relatively lesser capital stock than that of United States.

Generally, here another country even continent Australia has also huge capital stock. So, certain European countries also you know have had higher capital stock as compared to other countries. So, that is the latest figure and accordingly, we can project some forms of export or import of the respective resources.

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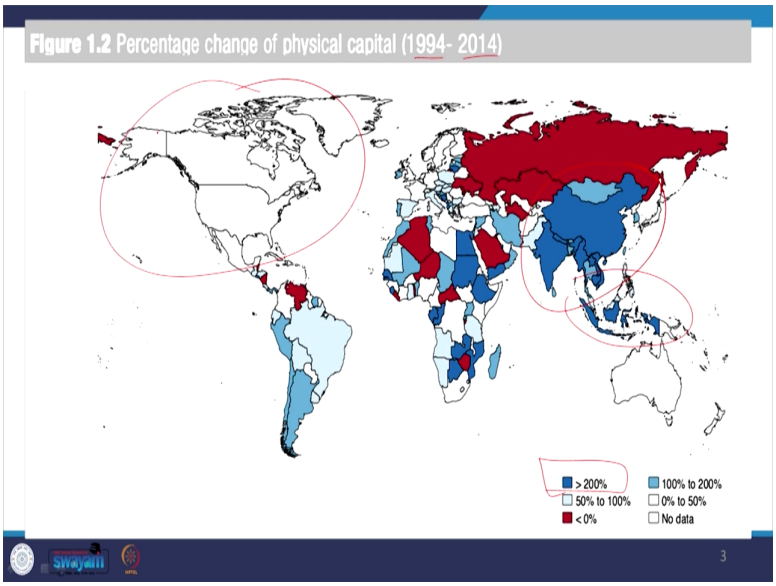

Now, if we express now, as we have seen from the same report there are many data collected from 1994 to 2014. During this period, the change has been observed; the change of capital stock has been observed. Now, which country actually progress in terms of capital stock? Now, with a 200 percent and more; 200 percent and more rise in capital stock or experienced in these continent India and China.

So, similarly some Southeast Asian countries as well and whereas, Russia even you know those developed country claimed to be the developed countries and they change on capital stock or capital physical capital is very negligible, over this period represented by the UN statistics.

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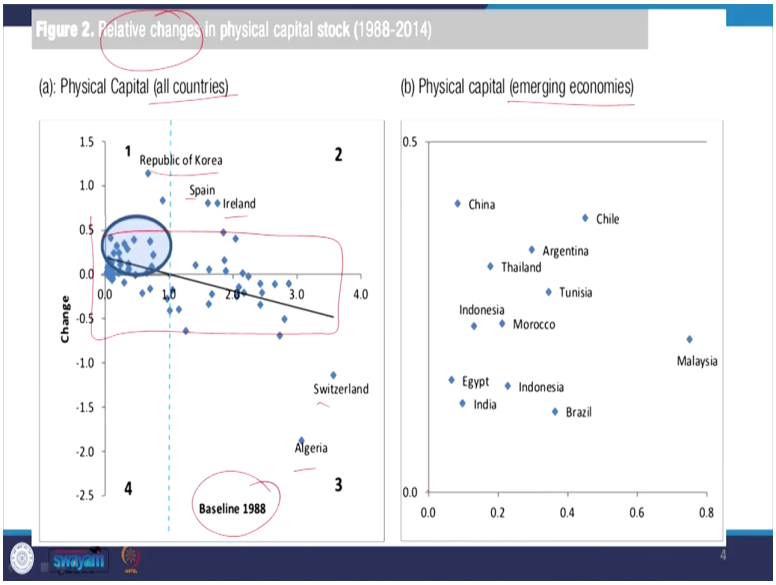

Now, similarly we should also try to know some other figures which are quite interesting to note; some other figures like relative changes in physical capital stock 1988 to 2014. So, we

try to compare here with all countries and emerging economies like India and China. So, in this context physical capital is being compared to the physical capital the change again, it is relative changes emphasized in the title.

So, the title suggest there the relative change are hovering around very less percentage except a bit of Korea, Spain and Ireland; Switzerland and Algeria negatively you know negative changes are noted. But largely those developed countries as we have presented during this period, have experienced you know the change near about you know minus 0.5 to 0.5 you know percentage which is very less.

So, in the near terms those country which claimed to be the capital you know intensive countries, I do not think you know they are going to progress or export capital intensive products in the coming years. So, this is this is very clear and these changes are compared with a baseline of 1988 because changes are based on a base period 1928. In the previous figure also, so the baseline was mentioned. Change the physical stock from here it is 1994, but now we are comparing with 18 1988.

Now, it is against you know the all countries and emerging economies. Now, specially, in emerging economies there is no negative change; very clearly mentioned here, there is no negative change, no negative part. But China, look at China, though the percentage variation of capital you know change in those emerging countries are not too high.

It is again within the limit of 0.5, but at least there is no negative term and India it is you know near about half of 0.5. So, it is still better than that of many other countries.

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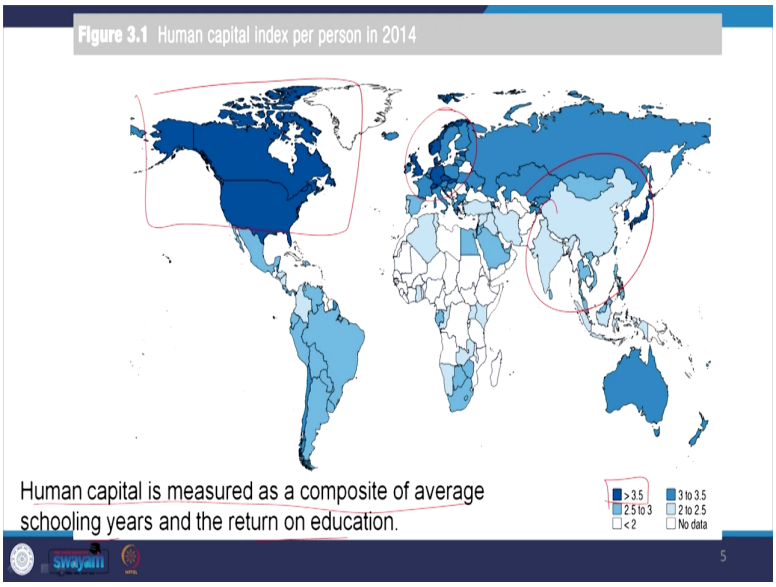

Now, it is you know it is not just human capital, they are not just physical capital which matter for the country to export products or specialize in certain products. These where economies suggest that it is not physical capital which actually determine the change, rather we now must think about human capital which is composed of you know majorly education segment. Even this human capital you know discussions are very much part of the new classical growth theory model like you know like in the Endogenous Growth model, it has been endogenized.

So, usually in solo models, solo in a growth model we have we did not see the endogeneity of the human capital. But later on in the advanced growth model these factors has been incorporated. Now, based on that many country, expect that human capital is really the determinant behind you know behind the productivity growth or the intensity of production or

intensive production. So, human capital index per person in 2014 as per the official figure, latest official figure; we must try to understand that there are variations.

Now, human capital here in this figure is measured by a composite average of schooling years and return on education. So, these are the two direction by which the human capital has been measured. Now, based on this, specially in 2014, the countries which are said with dark blue having you know greater than 3.5 is the index number. So, majorly again the physical capital the country is poised with high physical capital could able to spend, hugely on human capital you know indices; therefore, the return is also much better.

So, second highest probably is with India, China and those emerging country economies. So, what we have observed that you know human capital really is one of the important you know factors behind change; change in the change in the you know export and input function.

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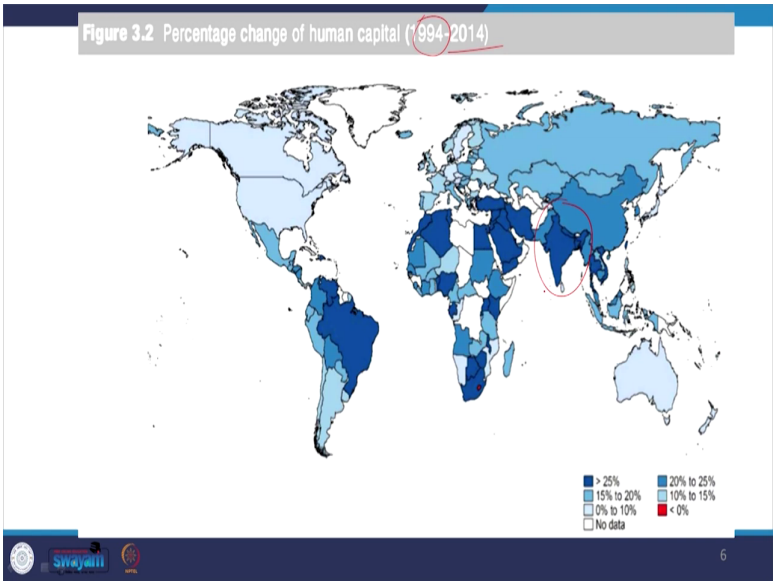

Now, look at percentage change of human capital from 1994 to 2014, what is important here is the following. So, what we found percentage change, you know just human capital is not enough; percentage is also change is also quite important.

We have observed that in the in case of percentage change India has position, India and other emerging countries positions were much better than the developed countries.

So, what we expect from H-O model, not necessarily we followed if we import emphasize on change the relative changes, the absolute changes in the absolute terms probably we have seen; we have already seen that developed countries are better off. Whereas, this percentage change wise if you see it from again from 1994 to 2014, the change is you know much better in India. Look at the change is extra I mean exceptionally better in India and some part of you know other emerging countries like Brazil, even in some part of you know African countries as well.

So, the human capital rise is exceptionally better for India. So, India has better future for you know specializing in those products which can generate you know good result in terms of exports. So, what we have largely understood so far based on the data is the following. We said that the country is poised with certain resources would necessarily export those variety of product.

But now in reality the emerging countries have actually specialized in human capital and they have grown their human capital segment and those human capital has been incorporated in other model other sector in it is actually supporting physical capital largely. So, therefore, the developing countries or a are now in a position to export other variety of products which requires human capital.

Now, now let us understand we have so far understood here Heckscher Ohlin model, assumptions criticisms or you know even facts, figures. So, in previous lecture, we did that. Now, let us you know fill up the gap with some extension of the H-O model.

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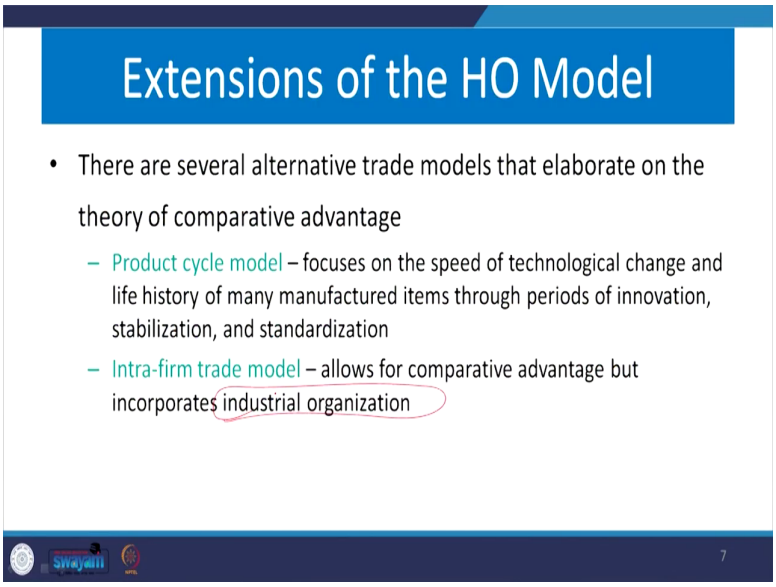

Now, there are several alternative trade model models which actually elaborate you know again the theory of comparative advantage; but as an extension of H-O because you know they largely emphasize the very assumption of you know modern assumption of neoclassical theory. So, one of the theory is called product lifecycle model which focuses on technological change and life history of many manufacture items through you know various forms of innovation, stabilization and standardization.

Now, this theory initially we said a country is going to specialize in some you know some forms of products; but and keep on exporting. But that will not continue for a long term. We have also explained it might continue for you know long term, it might continue for you know short term, it may continue for you know medium term. There are various models we have studied in the last lecture, l ast lecture which talked about its implications.

Now, product cycle model which says that it gets it goes by certain cycles you know one you know manufacturer or the industry will grow its product; but the product will be actually emitted by other countries over the time. So, therefore, the initial impetus received in the form of you know exports by the you know exporting country may not continue for a long run.

So, therefore, in the long run, the possibility of you know possibility of exporting this product continually is I think you know not feasible or not possible because of various other factors. Similarly, we will discuss in detail in our next slide. Now, what else is also important so far as extensions of this H-O model is concerned. Intra firm trade model, within the firm trade is possible, one sort of example which we are going to you know take it forward in the next week is actually based on economy of scale of production.

Intra firm allows comparative advantage, but incorporates industrial organization. It also emphasize organizations; strategies based on organizations and strategies based on organizations and group regime or you know basically collating with other strategies, other countries, other products, there are various possibilities.

Another way of you know understanding the model basically based on technological differences. Initially, we said it is based on you know availability of resources. Therefore, there are certain difference of technological you know additions. Therefore, capitals, stocks will add certain changes.

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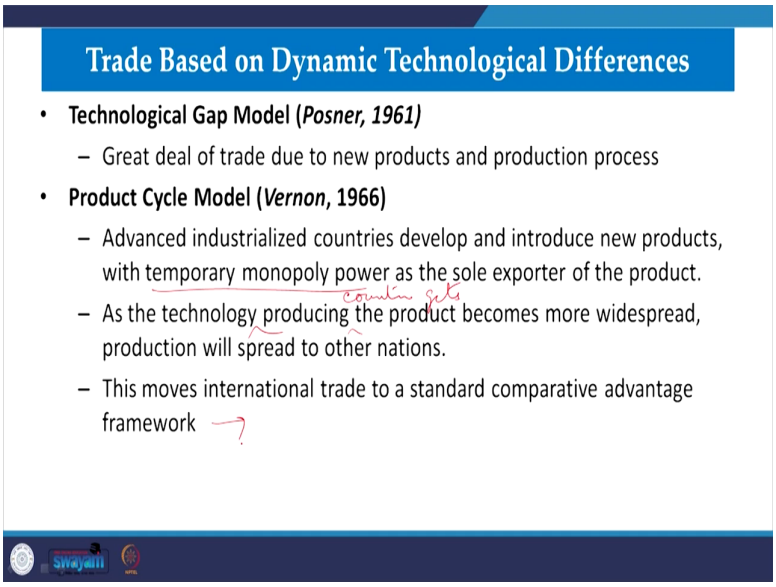

So, one model specifically targeted for identifying the specialization is through technological gap. So, we it was by Posner in 1961. The Posner emphasized the new product and the product process.

So, new product and product process later on after Posner product cycle theory you know came to the limelight and which emphasize the innovator to through the process to the adopters and according the advanced countries, developed the new product and introduce the new product, introduce the product with temporary monopoly power. This is what is very important, temporary monopoly power as the sole exporter of the product.

But later on, later on the technology you know producing I mean the country producing you know as a technology producing is the technology producing the product, technological advanced countries producing the product technology you know producing countries produce

the gets the product, gets the product become more widespread and production will spread to other nations. In short, this is you know these are short sentences. So, therefore, you read it between the line's can able to understand properly.

So, therefore, the product cycling model moves international trade to a standard computer advantage framework and it has a time component over the time, how things gets revolved.

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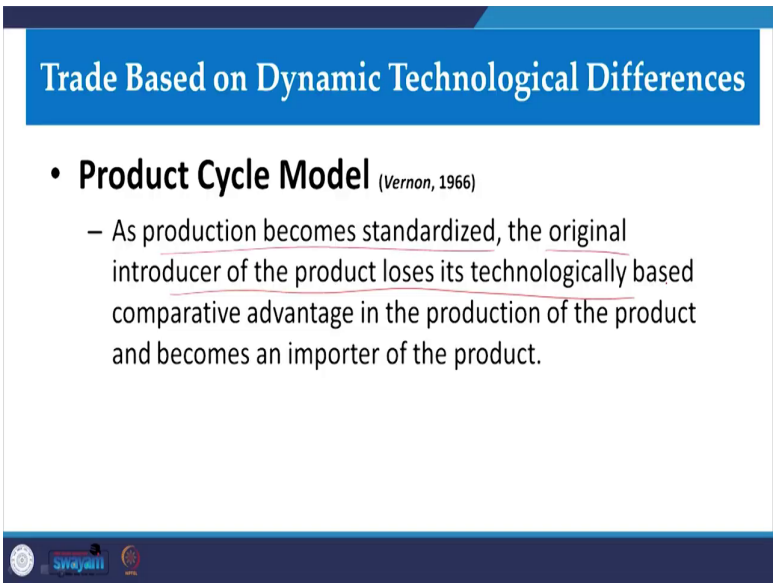

So, in short, the 1966 model of Vernon product cycle theory which is which says that you know as production becomes standardized, the original producer of the product loses its technologically based comparative advantage in the production of product and becomes an importer of the product.

So, so, basically as I already said over the time this phenomena gets changed. Now, what is all about? What are the arguments behind? So, basically, there are you know cyclical changes on the process.

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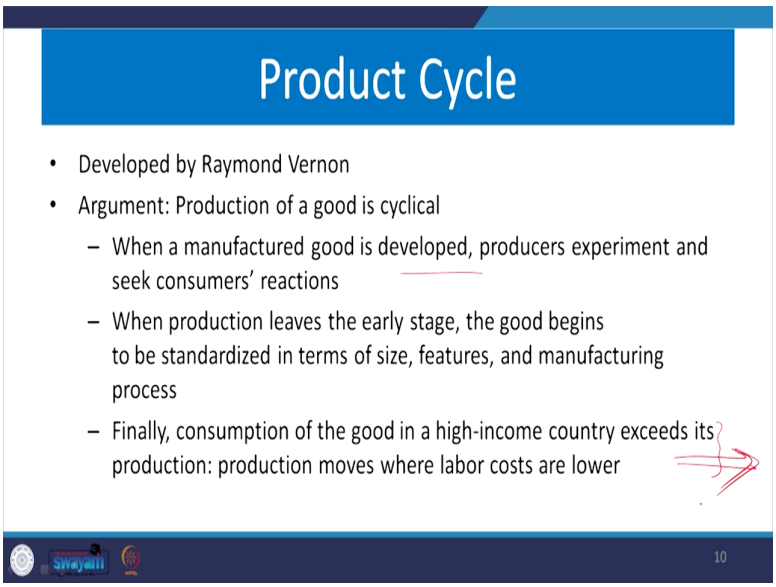

And a Raymond Vernon added that when a manufacturer good is developed, producers experiment it and seek consumers reaction after the production. When the production leaves the early stage, the goods begins to be standardize in terms of size, maybe by manufacturing process, by features, by qualities.

Now, finally, consumption of the good in high country exceeds its production. Production moves where the labor cost are lower. I mean basically once it gets realize it gets its movement to other countries which does not have the endowment.

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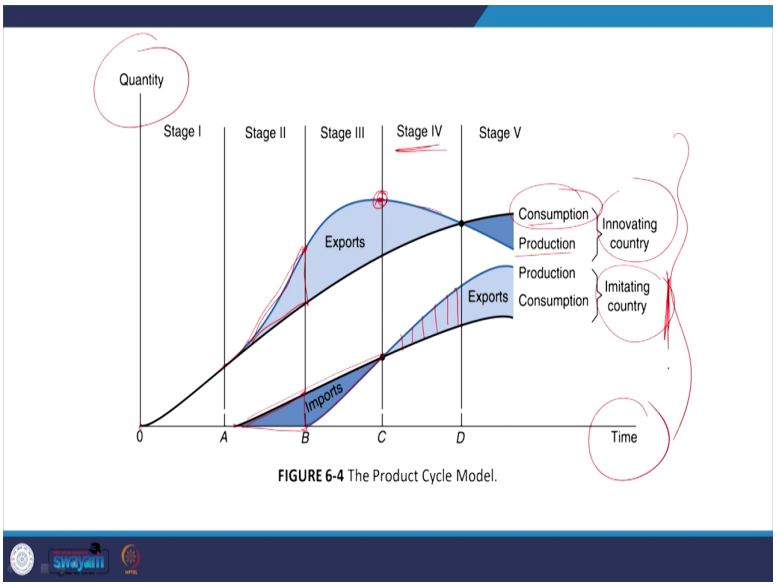

FIGURE 6-4 The Product Cycle Model.

So, therefore, it is one of the extensions to the model H-O model. Now, again we here emphasize the production function to be you know based on the new classical framework and these are from different source. So, these are not developed by the author. So, it is from different books collected. So, therefore we need to be understand the concept based on different expert's view.

Now, what we have observed here? Now, look at from this side innovating country and imitating country. Initially from starting with a time horizon and the quantity of production gets produced or produced. In the stage 1, so the country those are used to be the you know the advanced countries usually claimed is having you know huge number of patents, they in the initial stage they used to be exporter as well as importer. So, net balance of trade is 0 or there is no surplus.

But later on, they started imitating in you know there is a stage, they start imitating and I mean not start imitating. We started you know innovating. So, they innovate in the second stage. So, therefore, their net addition to export is high or positive and they keep on adding you know optimize their products till the time another country start I mean when the first country the innovating country expose the imitating country actually imports the extent. These are the extent of import equated with the exporting countries.

Now, why it reaches at a maximum point? And there has been a and you know depleting point, from that point the in the imitating country or the importer started imitating and replace their you know imports by exports. So, exports added in the stage number 4.

So, in the later part when the imitating country has been successful and replaced many you know expose could able to actually produce and then, initially they initially and now look at their consumption function and production. These line, bold line is consumption function for the innovating country and this line is for production function for that country and this is for the imitating country.

Now, you can see the imitating country in the later part of the periods are the net exporter; whereas, the innovating country are the net importers. So, therefore, product cycle model highlights the fact that the kind of regime some countries enjoys or some country poised with may not be continue in the long run.

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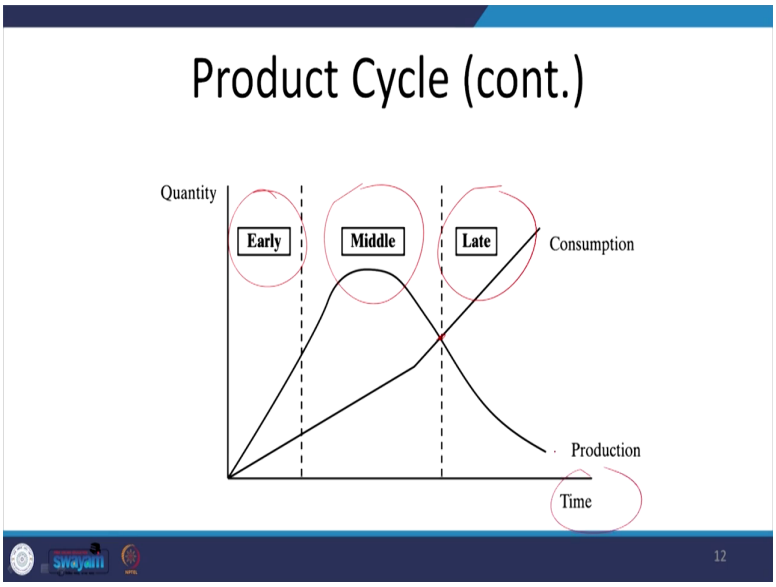

Now, in short, if we just put it like this in this figure; so, here early, middle and late. In the late, so consumption increases; so production receded. So, therefore, the stories of net addition to export gets change over time.

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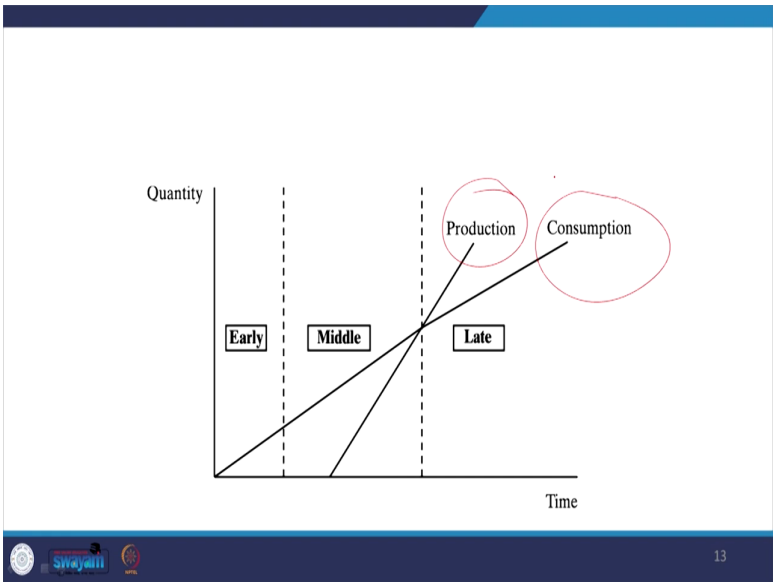

So, product cycle theory accordingly developed and so, and in another case where you know. So, here we here we said consumption exceeds production, in the next one we say production exceed in the imitating country. The production exceeds consumption in the in after some period or in the long run or maybe in the medium term to long run. So, they gets more value addition. So, they are you know claiming to be the better ones.

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Likewise, the emerging countries have actually magnificently change their pattern. So, most of the international trade, in international you know discussion trade discussion, we have observed that intra firm trade is very important.

And we will also take it forward in detail that which means trade between the parent company in the home country and its affiliate in a foreign country attached with you know huge firms of intra firm, which means firms take advantage of cross country differences in the price of inputs, quality of inputs and accordingly, they can minimize their cost.

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And so, to continue with the intra firm discussion in specially in the mid 1990's 95 onwards, two-third of the US merchandise exports and two-fifth of US merchandise imports carried out with the within firms. So, I mean you can imagine how much you know of the products are actually carried out, specially, through in you know intra firm channel.

Now, similarly since intra firms are being discussed in the present day discussion of trade theories, as an extension of H-O theory. Outsourcing has been observed is one of the most important channels because you know to minimize the cost, the countries tap their resources from other countries.

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Now, if when they find that our labour cost is expensive here, they outsource their product to other countries which has you know cheaper labour cost. And they outsource their product likewise we have used BPO sectors in India and we provide you know a service-oriented you know support to the top most companies, their outsource to minimize the cost.

So, globalization actually has held a lot to you know think of intra from firm trade and then, then so the country the H-O theory is purely based on domestic you know domestic you know endowments; but now in the present day discussion, this is no more domestic. Now, we are actually you know exploring or tapping the benefits across the globe. So, this is very important in the present day discussions.

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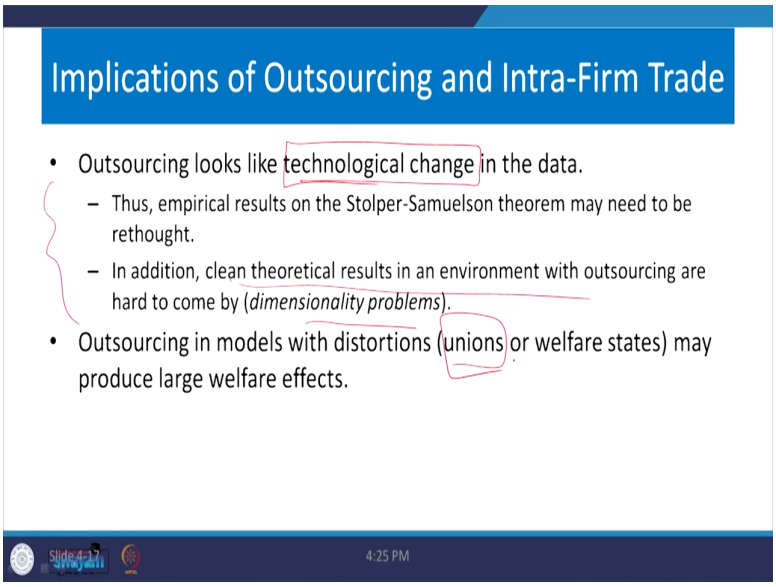

So, outsourcing look like technological change in the data. Because why technological change because the additions to the value or the knowledge addition is actually flowing and is start from another source. So, empirical results in Stolper-Samuelson theorem may need to be rethought.

Why may need why to be you know you know thought of again? Only because Stolper-Samuelson theory which says that you know income distribution, income distribution or redistribution of income which was discussed and specifically to the homogenous sector, specific sector and you know mobile factor is discussed in Stolper-Samuelson theory.

Now, due to outsourcing or technological change through outsourcing which has been incorporated in the model of trade may lead to further this distribution of income. In addition

also clean theoretical results in an environment with outsourcing are hard to come by dimensionality problems.

There are various you know dimensionality issues to be you know tech to be discussed in the you know next week in detail. I will talk about the you know outsourcing aspects with the help of intra industry model carefully.

It also says that you know outsourcing in models we distortions may produce large welfare effects ok. You it may go you know derived through I mean it may go for unions or through you know you will welfare states depending upon the extent of change, it might be also emphasized.

Now, which we have already discussed in previous lectures, where we talked about transportation cost, if our in incorporated in the model our you know specialization might vary. Initially, in all the model so far that they emphasize you know transportation cost to be 0 to discuss trade. Now, we have already seen that if transportation cost is added still H-O theory is not going to be or is not going to be invalidated.

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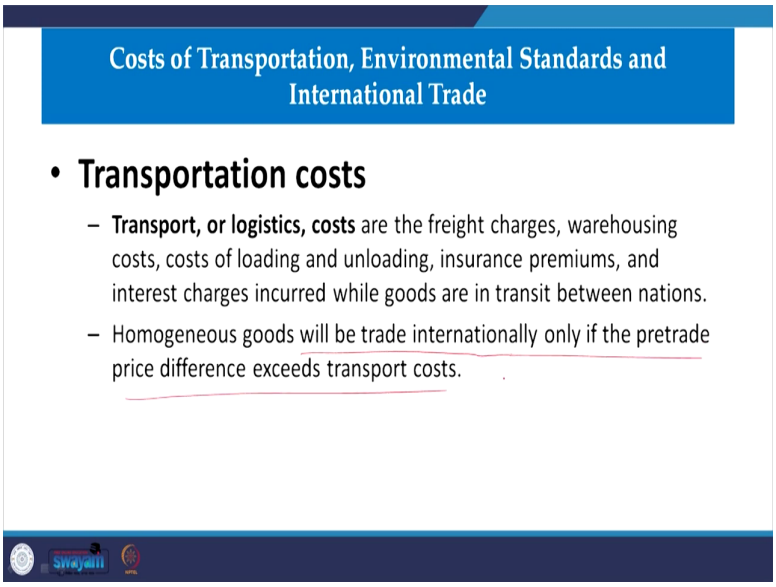

So, still H-O theory stands and important. We have already discussed, but still transportation cost. This is one of the most important aspects of cost addition. Homogeneous goods will be trade will be in trade internationally only if the pre-trade price difference exceeds transport cost.

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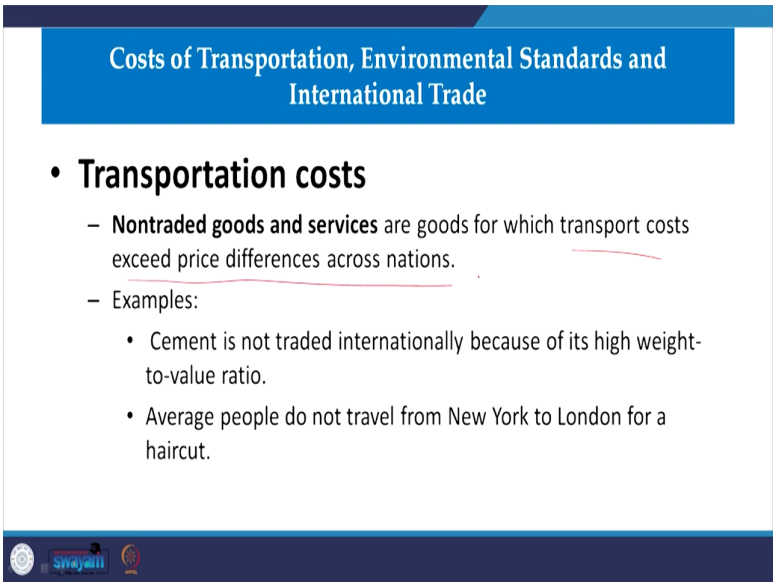

Now, transportation cost where non traded goods and services like you know or type of goods for which transportation cost exceed price difference across nations. So, basically non traded goods and services are goods for which transmission cost exceeds price differences. Basically you know the products which are exported or traded, it is quite sure that we you know the transportation cost is not exceeding. If it is exceeding by with the cost production cost, then those products are not traded.

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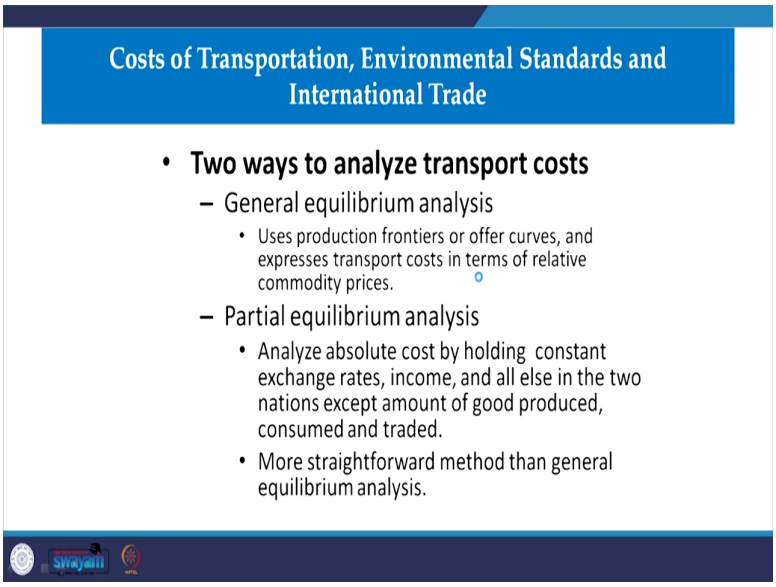

Similarly, I mean we have already cited these examples. I think since we have already discussed the fact that we can identify the transportation cost in a partial equilibrium set up with demand and supply figure like this.

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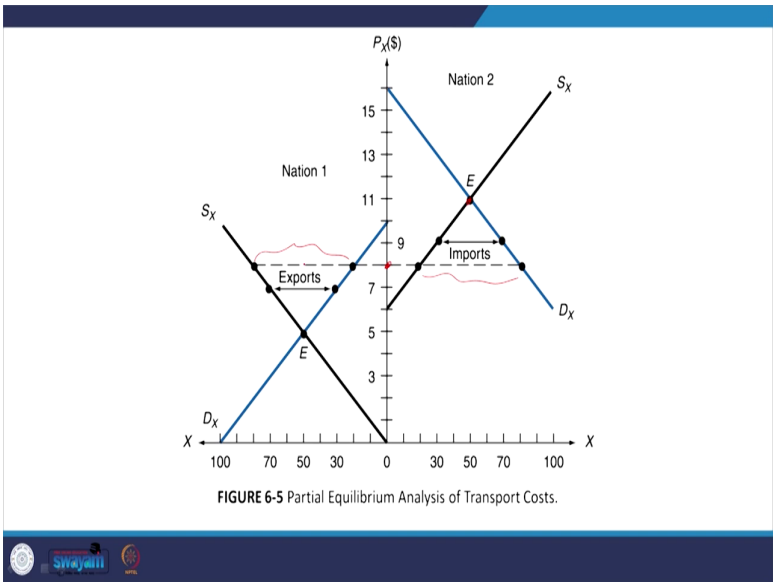

FIGURE 6-5 Partial Equilibrium Analysis of Transport Costs.

So, there might be an equilibrium price whatever the you know country 1 exports that will be tapped by a trapped in the form of imports by another country. But if there will be transportation cost there just prices will be shifted, prices will be changed. So, and accordingly, there will be new extent of production. We already discussed and but therefore, the H-O theory still valid, but this is simply an addition to the model.

Now, in a nutshell, we have discussed H-O theory, its extension, it's you know empirical evidences, its criticisms. Now, what is left then? H-O theory another extension in the present time is through new trade theory.

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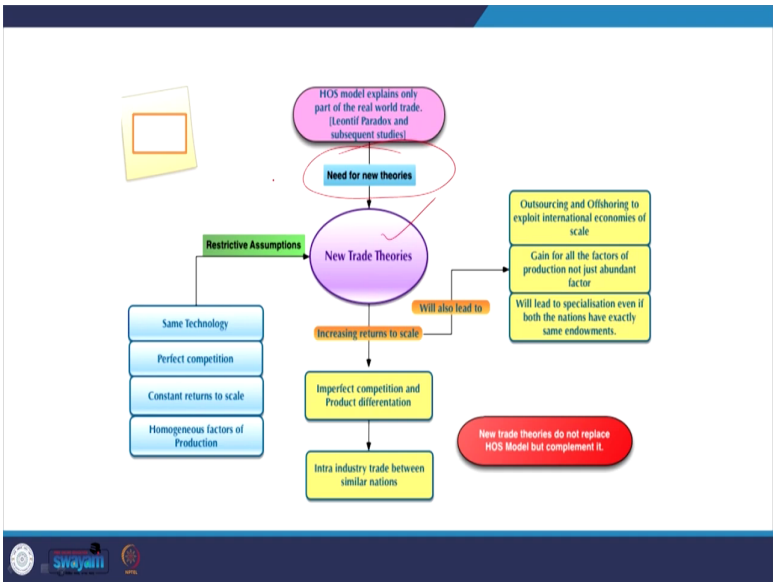

H-O theory is also called classical theory, this is also called classical theory, but new trade theory where we will talk about the production function. So, our next class, we will guide you very systematically on why we need for a new trade theory. Because of the fact that H-O theory did not consider production function to be you know exhibiting with increasing returns to scale.

Production function were assumed to be constant following with constant return scale. So, this is what is so far discussed. I think next class will be very interesting, if we discuss this in detail and some of the questions, we will discuss in our separate you know lecture.

With this let me stop here, we will carry forward.

Thank you.