Strategic Trade and protectionism Theories and Empirics

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Lecture - 08
Theory of Comparative Cost Advantage

Welcome once again dear friends, we are on the second week of NPTEL module on international trade especially on the area of Strategic Trade and protectionism. This is our second week 3rd lecture and specifically targeted to the understanding of classical theories. And this particular lecture is on emphasizing Comparative Cost Advantage, it is against atoms with opposition on absolute cost advantage theory.

Myself Dr. Pratap Mohanty, is a faculty member in the Department of Humanities and Social Sciences IIT, Roorkee. So, as a departure from the classical to again classical, but by developed by another advanced economist advanced theorist David Ricardo, who has contributed this theory to the understanding of the economics in a very better way. You already said that David Ricardo is not just an economist, he is also he was also a emergently a businessman and also ever been a member of their political house.

So, but he was a strong believer of free trade and because of him only the (Refer Time: 02:00) act which was the prevailing was actually abolished over the time and as against Adam Smith theory on absolute cost advantage. He said, that a country not necessarily poised with all I am poised with absolute differences in terms of cost functions as against another one. One might be and one might be having an absolute advantage in all the products one country might be possessing all advantages and all products were relatively the cost might be different. So, the relative sense is very very important.

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So, therefore, here it is retained that even if one nation is less efficient by absolute term to the then the other nation in production of both communities there is still a basis for mutual trade because of you know the form of relationship through relative differences. The relative differences are also quite important for the understanding of international trade.

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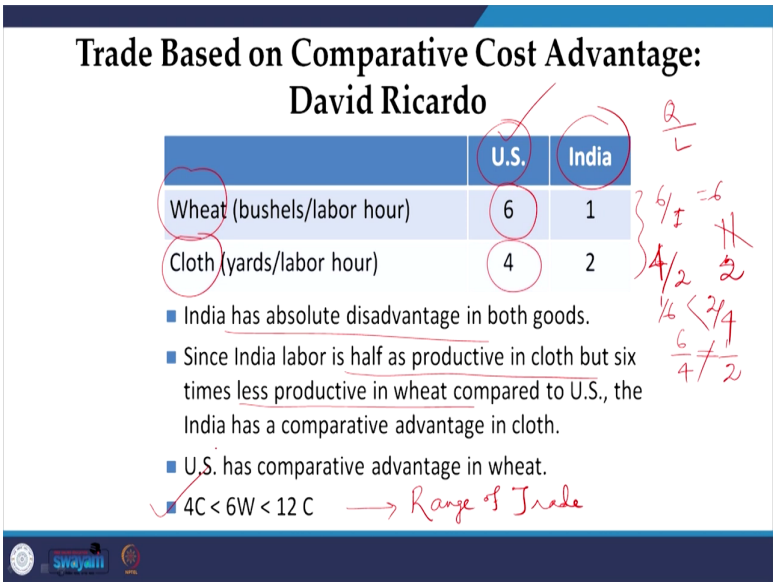

Now, we are again extending the same example; but now we are added here with different numbers or replaced with different number to highlight that absolute differences is not the solution for trade. So, what they said here with the same example which we have started explaining between two countries U.S. and India and for two commodities in terms of productivities we are here we are explaining productivities so, I mean delta I mean productivity Q by L or it or labor how much output is produce in terms of wheat and cloth.

What we have observed from this example is the following; first one we said the 6 units of labor is produced by U.S. per unit of by utilizing per unit of labor hour and whereas India is only producing 1 unit of wheat with the same labor hour and what happens to cloth again U.S. is having absolute advantage in the production of cloth with the use of labor hour.

So in both the products U.S. has absolute advantage so far as the theory of Adam Smith's absolute advantage concept is concerned or the theory is concerned. So, there should not be

actually any trade only because USA's advantage they send both the products. So, since both the products are being produced by U.S., U.S. may not be dependent on India.

So, therefore, Adam Smith's suggestions for international trade is not possible; possible in this context. So, but if you check relative differences still there is a window of trade possible is not it. So, do not you think so, yes. So, now, what I try to say is the following you know 6 unit as against 4 units now if I try to find out the relative you know differences 6 upon 1 tends 4 upon 2. So, here there is a possibility here is here we have a possibility of trade. So, here is 6 here it is 4 where here it is 2. So, see if these two are unequal then there is possibility of trade. Why it is so?.

Because relatively, U.S. is better in the production of wheat whereas, relatively U.S. does not have an advantage in production of cloth. Now, in reverse if you take 1 upon 6 as against 2 by 4 in India's production. So India relatively very weak in production of wheat, as against cloth;. Now even if you compare it you know horizontally instead of vertically horizontal difference is like you know 6 I mean if you look at US terms of trade 6 upon 4 6 by 4 and 1 upon 2. Now, just comparing U.S. as compared to India here also it there they are not equal.

When the terms of trade or the rate at which you know things are all communities are produced or goods are produced. If the rates are not same then there are high chances of you know cost of production to be different and the countries participating in or trying to explore the possibility of trade the country will define certain windows of relationships.

So, by absolute term India has absolute disadvantages in both the commodities so India is half you know India produces India labor is half as productive in cloth and one-sixth or 6 times less productive in wheat. So, India has a comparative advantage in cloth if you try to you know take the relative differences by you know cloth.

Now look at India here 6 times weaker for wheat, but it is actually India is only half the rate weaker than that of U.S. in cloth production so therefore, India may specialize in cloth. Now, how is trade possible then? You know, we have explored here with the fact that you know there were two countries you know define some kind of you know they have the resources

which differentiate their relative differences or which differences their relative you know possibilities or relative cost disadvantages.

Now, in this context if you try to explain the possible trade or how much to be produced by which country or what are the mutual possible trade this is here we are trying to define the range of trade. How much maximum trade is possible? Now, what are the caveat of trade? And what are the border line of trade? How much each country should actually maximize? Now, the example is 6 4 1 2 we will explain it here 6 4 1 and 2.

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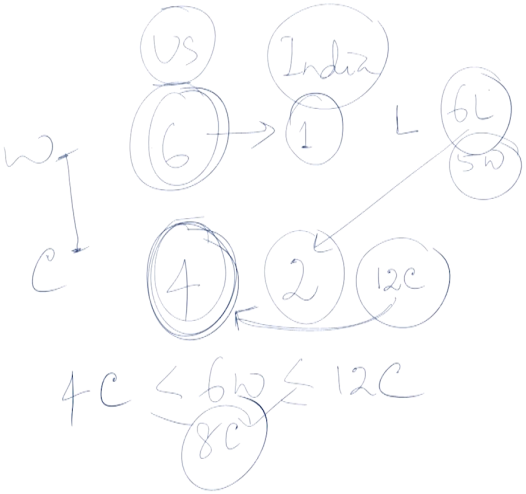

So, this is US, this is India, this is wheat, this is cloth. Now as for the absolute cost advantages theory, we observe the both are actually having absolutely I mean US has absolute advantages advantage in production of both the commodities. So, there should not be any trade as for the proposition of Adam Smith theory.

Now, David Ricardo actually counteracted it; rejected the proposition of you know Adam Smith with the same assumptions which are already built in the classical theory by Adam Smith we almost with the same example. Now David Ricardo proposed a, relative differences which has caused for a possibility of trade; only because of the fact that the terms of trade or the relative differences of cost are different now.

And how it is different? How much? What extent the US will benefit out of it? What extent India will benefit out of it? It seems as if you know India is actually having disadvantages in producing both the communities. But if they will be trade, India will certainly be opening its you know hand to US for exchanging goods whereas, US may not be interested.

Now let us explore how? Why US is not interested to get in touch with or exchanges commodities with India? Now let us start with how much? So, let we will start with US Because USA has advantages as in both the commodities. So, how much US I mean; if you compare the you know wheat and cloth in these two comparison US is better in absolute sense to produce wheat. So, let us emphasize US to produce wheat.

So, in order to produce wheat US requires 4 into a cloth first for sure and you need to produce wheat and to export to India US must have received 4 you at least 4 units of cloth. So, 4 units of cloth is mandatorily required by US essentially required by US in order to export 6 units to India.

Now, if you now India receives 6 units or US has agreed to export 6 units of wheat to India; now India can able to India can at maximum for 1 unit of labor India at maximum can able to produce only 1 unit of wheat. Now that 1 unit, may be 1 quintile, may be 1 you know ton maybe you know 1 bushels. So, here we are interpreting in term one bushels; one bushel. Now, if 6 units of wheats are received by India; India requires in order to produce the 6 units India requires 6 units of labor.

So, now India can easily save 6 units of labor to produce or to get that much of amount of wheat. So, India actually saved 6 units of labor. So, what India will do you do? India will try

to specialize in another product. Now, India has double productivity then its wheat double productivity double the productivity then that of wheat for cloth. Now, cloth India can able to produce double.

So, see if the 6 units of labor hours are actually engaged in the production of cloth so 12 units of cloth can be produced by India. Now, if double the 1 is engaged or 2 elements at maximum cloth is produced by India. Now, if how much it max how much minimum requirement for trade by US is there? It is only 4 units minimum. So, now, India is happy to export more than that so, India is since you know is happy can able to produce more than that, so, India will be exporting that much. So, 4c against w 6w which I have already said 6 units would be exported to India then maximum 12c can be produced.

Now, India can maximum export 12 units of cloth to US if and only if US exports 6 units of wheat. Now, India can save how much? India can save 5; 5 units of India receive extra 5 units wheat because of trade. Now, if all 12 units are exported to US to 12 units of cloths are exported to US 12 units of cloths are exported to US. So, only 4 units of can domestically produced 4 units of cloth US can able to produce domestically.

So, US can save 8 units of cloth extra. So, US is getting advantage out of trade, India is also getting advantage out of trade. So, if you try to compare the net effect of trade. So, therefore, relatively trade is possible and this is therefore called the mutual beneficial trade between two countries and this is this was the possibility and this has been the order of trade over time as proposed by you know David Ricardo.

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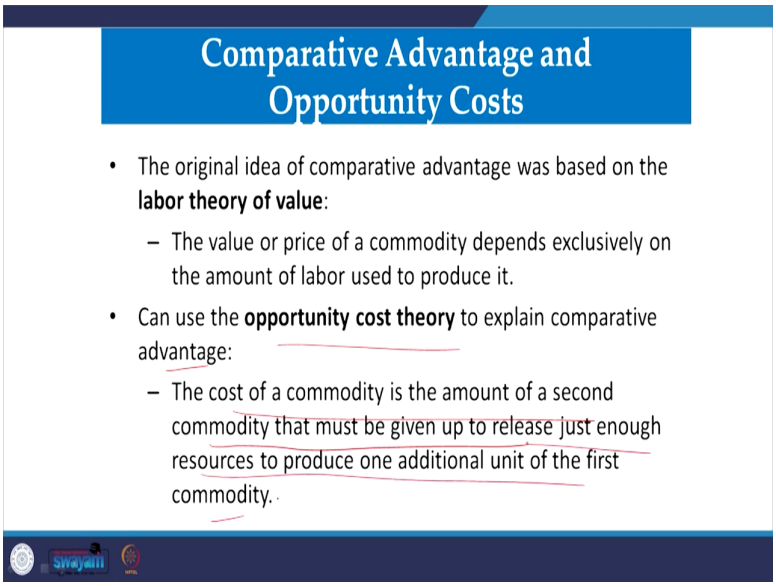

Now, this theory is largely based on labor theory of value. So, labor is the unit of measurement which I have already said and only because other units of measurements where; where not to you know accepted by the European countries or during that period and so, largely labor is we have already mentioned in the last class is the unit of measurement.

So, can use the opportunity cost theory to explain comparative advantage? Yes, we can. We have said the productivity is we can express into the opportunity cost theory. Now, what do you mean by opportunity cost theory? Opportunity cost said that the next base alternative cost which has been forgone.

So, that means, in order to produce wheat, how much amount of cloth US actually forgoes? So, US has actually forgone has forgone 4 units of cloth in order to get 6 unit I mean; US has in order to get 4 units of cloth US has forgone 6 units of wheat and that has to be actually

replaced at least 4 units of cloths should be received from India. So, the next best alternative cost so that is I mean a good measure of measure of exact cost of production.

The cost of a commodity is the amount of second commodity that must be given up to release just enough resources to produce one additional unit of the fast community. So, that is basically the next best alternative to be produced to give off the first one and that was the proposition made in this theory. So, since we talk about or talk about and we express the opportunity cost principles we can express that you know the explanation through Production Possibility Frontier PPF.

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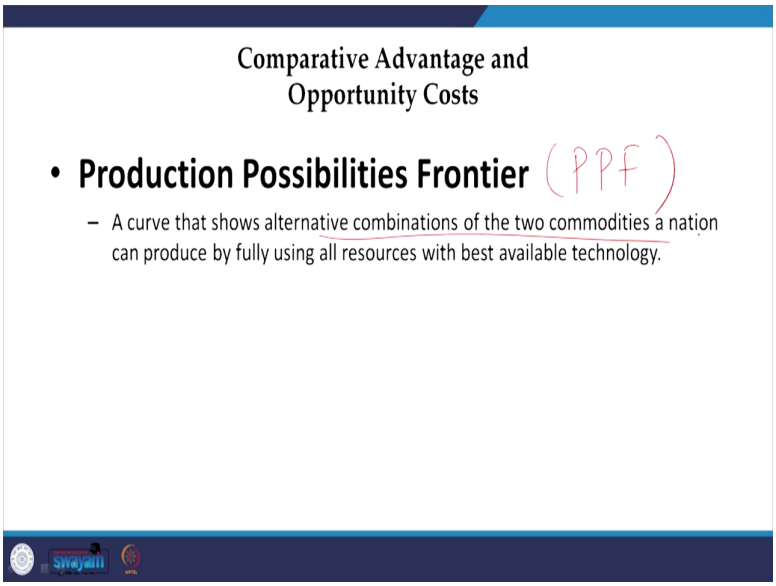

So, the curve that shows PPF is a curve Production Possibility Frontier is the boundary expressed with a curve. It shows alternative combinations of two commodities a nation can produce by fully utilizing all these resources with best available technologies given time

given a stipulated time period usually we express in 1 year or maybe in another year another time period or the duration can be also expressed.

Now, the assumptions which are also important in classical theory is the production possibility frontier they expressed with the assumption of constant opportunity cost, that the every time for extra unit of production the units require extra additional amount of cost to produce 1 unit of extra unit of another production.

So, the there their assumption is constant opportunity cost. So, resources that are perfect and constant opportunity cost is possible if the market for an factor as well as products are actually perfectly competitive; perfectly competitive.

And the resources are also perfectly substitute for each other, then only a perfect combination is also possible and perfect and substitution is possible and accordingly fix proportions in production of both the commodities and to be utilized also this requires that the factors must be very homogeneous in nature otherwise the fixed units is very unity is very difficult to define.

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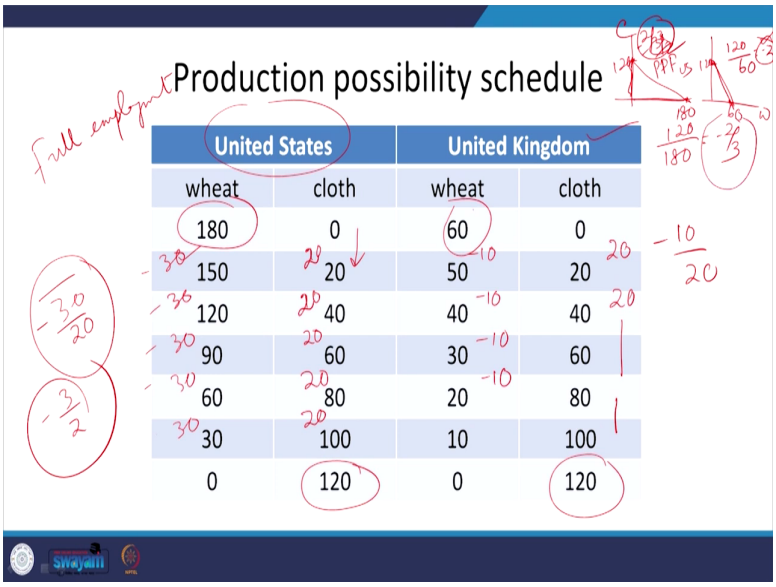

Now, let us explain this with the help of realistic example in work sheet if United States produce wheat by this opportunity cost and against US cloth and as compared to UK. Now, we have if the total resources usually you know resources are scarce and if we optimally use all the resources and all the resources must be utilized fully so therefore, the classical economies also believe in full employment.

So, if the all the resources are utilized for the production of wheat not cloth so at maximum, 180 units of cloth can be produced. If all the units of resources or the labor units are utilized for the production of cloth at maximum 120 can be produced. So, every time in order to produce 1 extra unit that is 10 extra of cloth US has to forgive some units of you know, wheat 30 units of wheat.

Similarly, for another 10 another 30 has to be sacrificed. For another for every time 20, for 20, this is 20, sorry 20, 30 another 20, this is again 30, so 30, again 20 here. So, for every additional 20 units of cloth US has to sacrifice 30 units of wheat and 30 by 20 30 by 20 is constant throughout.

So, the opportunity cost is actually constant for the production of wheat and cloth. So, this is constant throughout. Similarly, if you check with United Kingdom; UK so, this is for extra 20 units here 20 units every time, here United Kingdom sacrificed 10 so, minus 10 minus 10 minus 10 here also minus 30 minus 30 every time so, this is minus 10 and accordingly followed. So, this is 10 by 20 so, minus here minus.

So, the product production possible to this is called production possibility frontier at maximum how much can be produced? Here, it is 60 as against 120. Now the production possibility frontier says that so, maximum 80 of wheat; wheat as against 120 of cloth in US and maximum you know we can express it here as well in two you know diagram this is maybe wheat this is maybe cloth we can express it.

So, at maximum wheat will be 180 and maximum 120 here if you plot all possible combinations can be derived and the this is called production possibility frontier for US. Similarly, I mean the slope is here is minus 3 by 2; this is minus 3 by 2 the slope is this by this sorry this is reverse this by this so, this is minus 2 by 3; minus 2 by 3.

This vertical distance, perpendicular distance divided by base or this is equal to 120; 120 divided by 180 is the slope is minus 2 by 3. Similarly, for UK it is 120 here and as against 60 here; 120 and 60, 60 units of wheat. So, 120 divided by 60 is the slope is minus 2. Now relatively, this is relatively there are differences in opportunity cost of production this is minus 2 as against minus 2 by 3, so there is possibility of trade.

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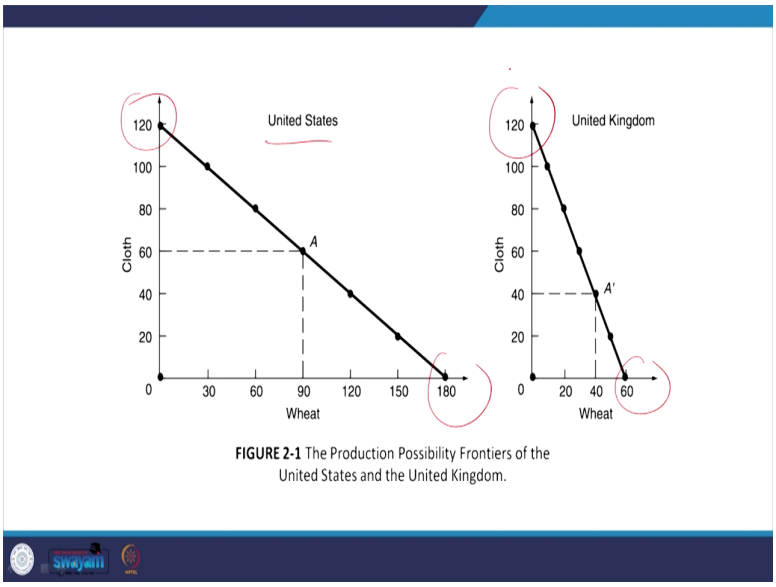

FIGURE 2-1 The Production Possibility Frontiers of the United States and the United Kingdom.

So, we are going to explain it with the help of this diagram which I have just derived. So, 120 is against 180 for United States and 60 as against 120 for United Kingdom. Since the this is called production possibility frontier and the slope defines their you know net barter terms of trade or the opportunity cost since opportunity cost of productions are different in two countries, so trade is possible.

Now, in the absence of trade what that trade a nations? Production possibility frontier also represents is consumption frontier if there is no trade for certainly the country is bound to you know have its consumption basket of the entire products. Increase output resulting from specialization and trade represents nation's gains from trade and allowing nations to consume outside production possibilities frontier.

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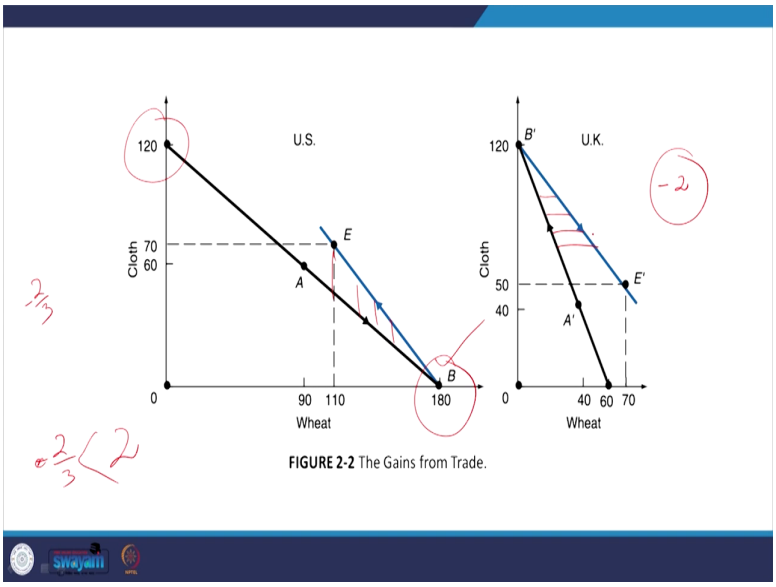

FIGURE 2-2 The Gains from Trade.

Now, after trade what is going to happened; now what we have marked here now we have said that US is at maximum or US can able to produce 180 of wheat and as against 120 and there you know slope is 2 upon 3 where is UK is slope is minus 2 that is 120 by 60. Now, compare these 2 of minus 2 or 2 by 3 by its you know by its more this is 2 by 3 as against 2. So, this is greater than that of 2.

So, relatively UK; now if you compare it very carefully UK the I mean relative cost of production for wheat is a relative cost of production for wheat in US is low as compared to relative production of wheat in UK so therefore, there is possibility of trade. So, what US will do US will specialize in production of wheat.

Now, if there will be mutual possible trade and US is going to export you know US to export wheat to UK in return you know US is going to get more of clothes so this vertical distance

actually increases and this is beneficial for US. Similarly, more of wheat is actually received by UK in terms of; in terms of wheat, so this is going to be beneficial for you know UK. So, therefore, there will be a trade and both the countries will grow.

Now, there will be there must be a point discussed where you know since the relative prices are different before trade. So, the mutual power beneficial trade will actually equalized trade equalize their terms of trade and till then they will be in trade.

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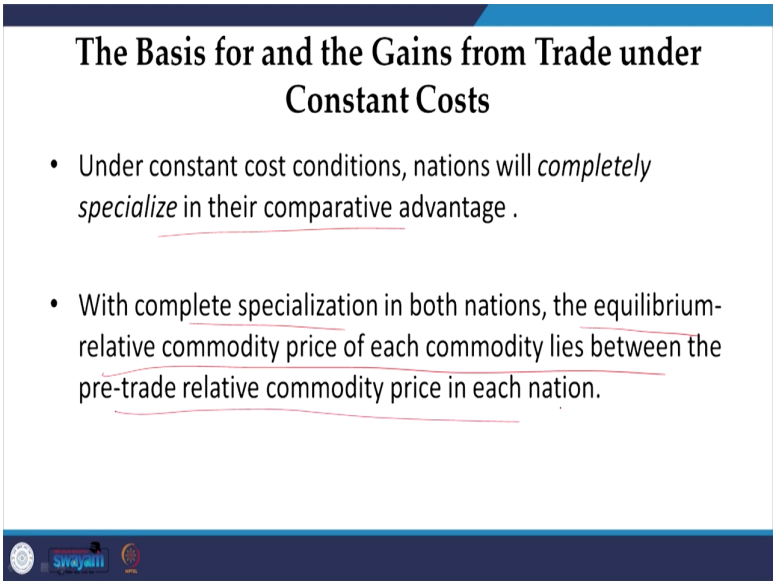

Now, under constant cost conditions which I have already said nation will completely specialize in their competitive advantage because once they have understand they are competitively the cost of production are different, so countries can able to produce and with his specialization and said for US it is wheat.

With complete specialization in both nations the equilibrium relative commodity price of each commodity lies in between pre-trade relative commodity price I mean lies between the pre-trade relative commodity price in each nation.

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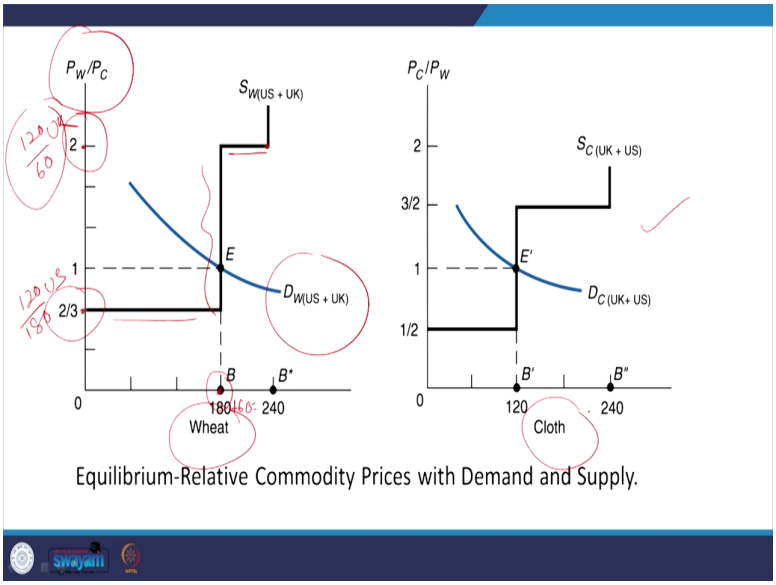

Equilibrium-Relative Commodity Prices with Demand and Supply.

So, I will talk about in this diagram with the relative you know supply and demand curve. In order to find out this is for wheat we are trying to explain this is for cloth of both the countries. Now, what is the total supply? Now, so far as I have already said the cost of production and the opportunity cost of production of wheat in US; it is two-third whereas, or the opportunity cost of you know cost of wheat in England, it is double because you know 120 by 60.

So, let so the borderline the opportunity cost by which this is 120 by 60 this is 120 by 180. So, in this context what we tried that the maximum possible the opportunity cost of producing

you know wheat is 2 in UK this is in the US which is cheaper. So, relative cost of production of wheat is cheaper in US.

So when it is two-third if the relative price in the internal market is two-third so US will be reluctant to trade. Once the relative prices increases US will increase its production. So, given the price is two-third US will be ready to produce 180 units of wheat which I have explained in the previous diagram 100 and 180 units here so now, US can able to supply 180.

Now, if price increases price increases and he reaches till the level 2. Now once it reaches to UK starts producing you know start producing wheat. Why is it? Because; because UK and its domestic you know availability of resources permits you get to produce at this rate at to 120 by 60.

So, in when the total trade I mean when the relative price is reaches at here we are expressing in terms of relative prices P W divided by P C; it says to UK can able to contribute another 60 which I have already says 60 units of wheat; so 180 plus 60 which is equal to 240. So, total amount of you know total amount of wheat available in the world with two countries is 240.

So, in between there is no prices or other information I mean you know visible. Here, it is you know in between near visible, so this is the stepwise supply curve. Now, after trade given a demand; given a demand if passes through these vertical distance then that price will be beneficial for both the countries and both the true country will try to exchange. If the price is actually in other you know range then there will be no trade; similarly for cloth we can explain for UK context as well.

Now, what we say I mean you know to understand you know the comparative advantage in realistic sense Balassa's work on; work on revealed comparative advantage index is very famous many economists actually utilized this index Balassa is actually very famous in explaining the index as per the following the links are given here.

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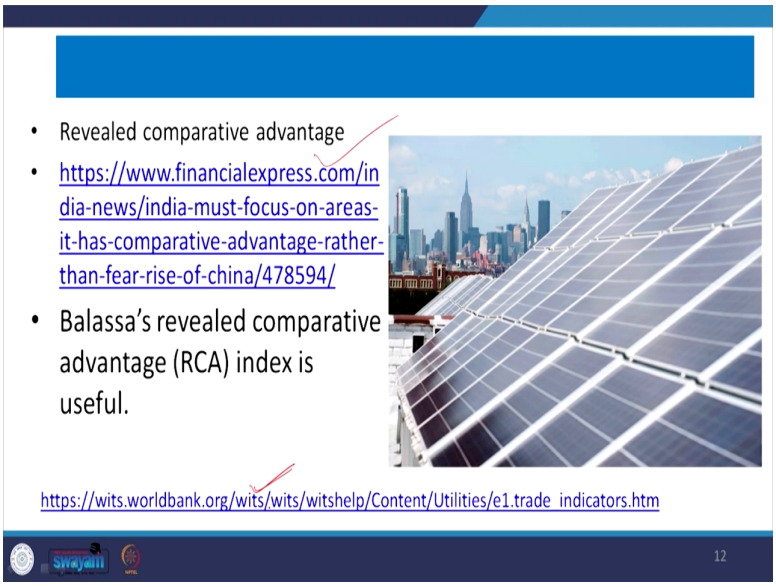

The links for understanding revealed comparative advantage from this article financial express article as well as from wits; wits database world intellectual trade solutions published by world bank explains various you know indexes in measuring world trade and; and; and compared to cost advantage details with the help of revealed comparative advantage is also explained.

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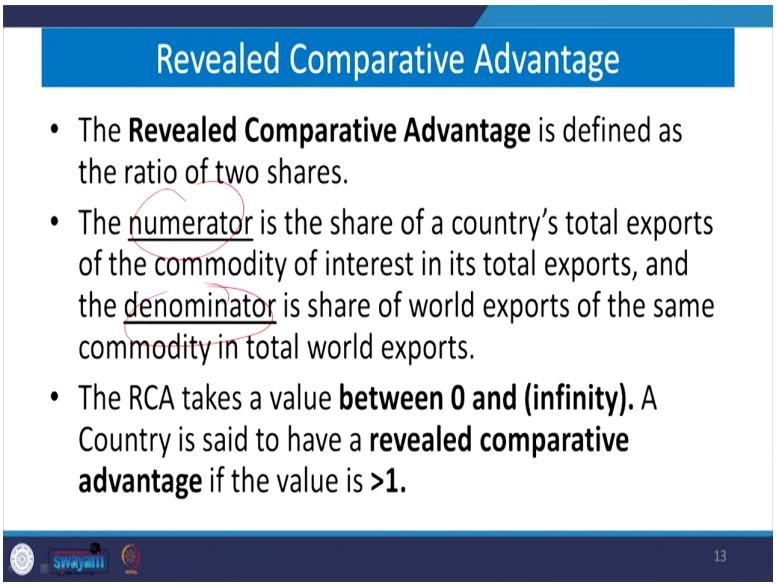

Now, what is revealed comparative advantage? The revealed competitive advantage is express as a ratio as an index as the following like you know let me make it very clear I mean with a very lucid example or lucid you know approach. Here, I have expressed in numerator and denominator. What is the what is in numerator and what is in denominator?.

In the numerator we are expressing the particular commodity and it exports divided by the total exports that is all in the numerator that is basically we are saying what is the relative share of the particular commodities in the export basket of India if we are referring to Indian context is against the relative share of that particular good in the world trade as against the total world trade. Now if it is now one country's you know relative exposed as comparative to total relative exports.

Now, if it is you know you know more than 1; that means, that country has relative advantage revealed relative advantage in that particular commodity. Now similarly, I mean the what is the range of trade then I mean what is the maximum border line of this index it is zero to infinity and can be explained.

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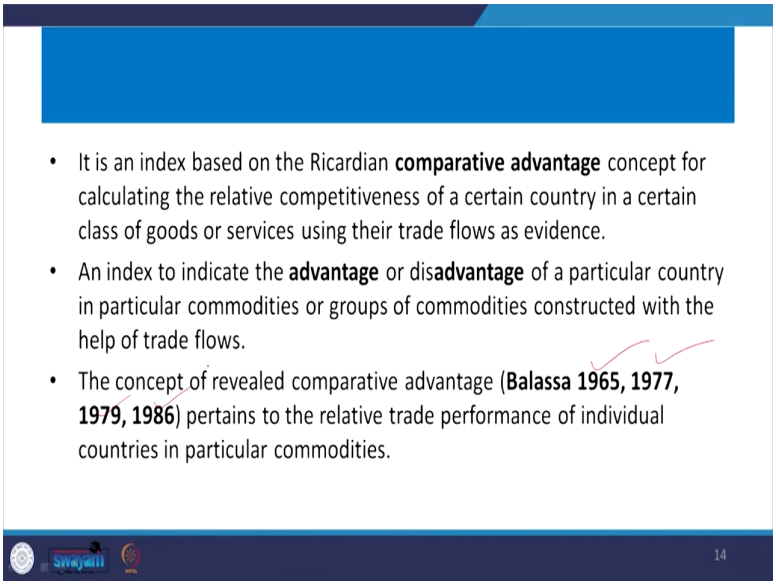

Now, accordingly Balassas's different papers in 65 77 79 86 also explains for the various countries. I have already explained the numerator this is in numerator and this is in denominator and these are followed.

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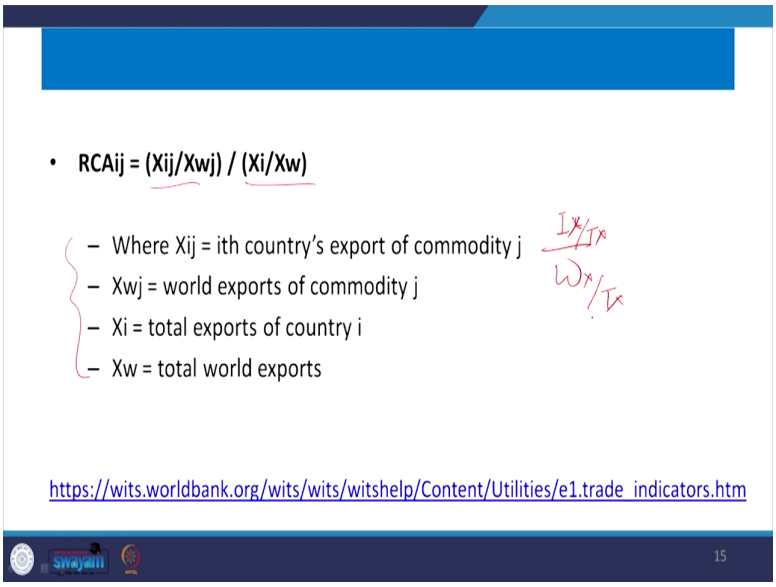

In the numerator basically, we are explaining individual countries commodity single India is compared to world for example, so India's exports of that particular exports of that particular commodity of the divided by total exports. Similarly, world exports of that particular commodity divided by total world exports so, if you take a ratio and we get the value.

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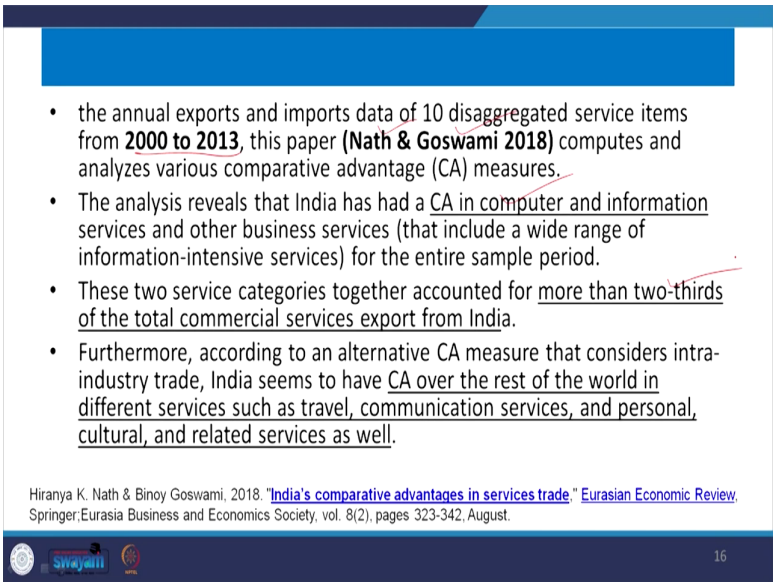

Now, where to for various year other years for India as expose and its revealed competitive advantage Nath and Goswami 2018 paper is very important where they already calculated for various industries and they now found that India used to have you know revealed comparative advantage in computed apparel's and information services over this period.

And similarly these two service categories I mean basically we are trying to say information services as well as computer related services can account it for two-third of the total commercial services exports from India and in other goods as well you can read it from the slide.

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Now, last content of this particular lecture to explain that how we already explained the in the first week lecture now again I am explaining; that India has 10 of you know revealed comparative advantage in other sectors than hardware manufacturing so therefore, India is not be worried against china. So, these are all the extent of analysis for comparative advantage we will carry forward the criticism of the classical theory in the next class.

Thank you.