Strategic Trade and protectionism Theories and Empirics

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Lecture – 20
Measuring Intra – Industry Trade- II

Welcome once again friends for the NPTEL module on, Strategic Trade and Protectionism Theories and Empirics. We are on the you know week 4 lecture number 20 on clarifying further to the previous content on Intra Industry Trade and an its measures. As we know there are so many you know different methods of measuring intra industry trade and it has huge relevance for the developing countries context. So, therefore, we are supposed to clarify the nitty gritties of you know trade measurement.

So, as a background to the understanding of intra industry trade, we have already discussed in the last class so better to recapitulate the discussions further. And the first important point for discussion here is that it constitute the intra industry trade component constitutes the major portion of the world trade and also specifically for the you know Indian context.

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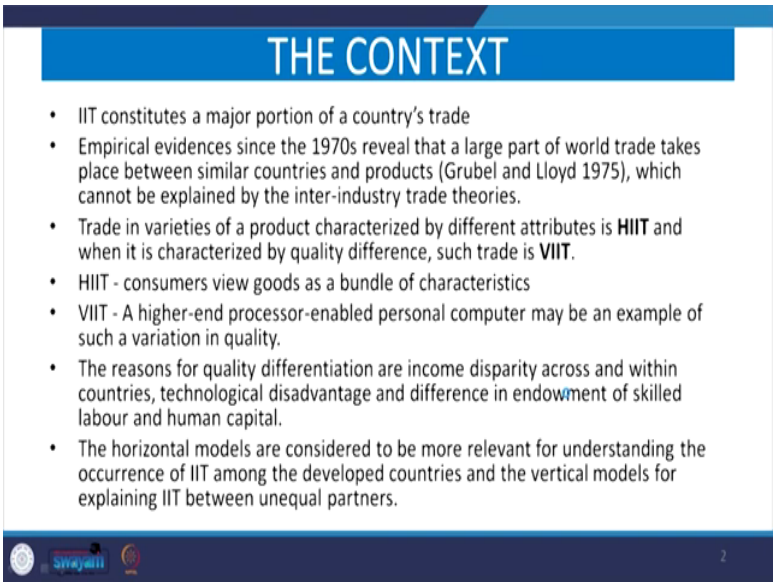

Now, the empirical evidence since 1970 by different articles suggest that, you know the maximum world trade actually takes place among the similar countries. Specially identified by Grubel global in Grubel and Lloyd in 1975; following the you know new classical approach of international trade theory. Or the you know the you know consequences of the new trade theory, discussed largely on intra industry segments then the intra industry segments in the trade patterns.

Now, looking at the variety of products in the basket of trade, majorly we are confining our analysis of intra industry trade in two channels; one is through horizontal approach or another is through vertical approach. So, therefore, it is called horizontal intra industry trade or it is called you know vertical intra industry trade. Horizontal where certain attributes are different

so, usually the products varieties within the industry or within the farms are more. Whereas, in case of vertical segment, we can characterize those differences by quality.

So, higher the quality vertically the products are actually you know differentiated. Now so therefore, we just mentioned here that consumers actually view goods as a bundle of characteristics in case of horizontal in intra industry trade. Whereas you know for vertical they characterized by different quality you know quality of the product. And one such example is computer personal computer industry, where we have different variety of processors enabled in a single you know product line called personal computers.

So, even in the personal computers are actually varying by quality because of the quality you know the processors enabled in each of the units. Now the qualities you know I mean quality preference or the differences in the quality in different countries may be largely corroborated by the income disparities among the countries or within the countries, technological advantages or disadvantages differences in endowments of skilled labor or human capital.

Now looking at the horizontal model once again, we are we considered these to be more relevant for understanding the occurrence of IIT Intra Industry Trade among the developed countries and the vertical models for explaining IIT between unequal partners. So, usually what we have already mentioned in the previous lecture that horizontal models are more relevant among the developed countries, they used to have trade for horizontal different products or differentiated products. Whereas, among the unequal partners on the countries, vertical models are more relevant these are the views from different experts.

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Now discussing on the differences based on quality or even the characteristics countries are divided. Largely as I just said in the previous point that countries are actually you know differentiated by quality. So, and vertical intra industry trade takes place among the unequal partners. So, therefore, there is a clear argument discussed in the trade theory called north versus south trade differences. North versus south you know a trade differences north stands for developed countries and south stand for developing countries.

Developing countries are largely produces or exports exporters of poor quality products is emphasized by Acharyya into 2005 Marjit and Raychaudhuri in 1997, we have already discussed this in the previous lecture. Recently the developing countries suffer further due to non tariff measures by developed countries in the latest discussions. We have also discussed

part of this argument in our introductory lecture, where there are various forms of invisible kind of restrictions raised by the developed countries for the developing country.

So, therefore, developing countries products are at risk for exporting in the international you know market. Hausmann specially in his in its to Hausmann et al in his 2007 paper mentioned that countries are actually poor because of their activities countries become what they produce. So, even we discuss before on one of the models of trade called emphasized by professor Jagadish Bhagawati called immersing growth rate.

So, where though we discuss about terms of trade the prices and its attachment in the international basket and it defines the value of a product. So, price is one of the reflections be or one of the representations behind understanding quality of the product. Since quality variation depends on technological advancement and the availability of human capital all the skilled laborer. So, the transition from horizontal to vertical or the other way around; I mean is actually important for policy you know implications. Especially for the domestic economy or specially for Indian context.

Therefore, we are supposed to understand what kind of transitions are there from one variety of IIT to another variety of IIT. So, the share of intermediary goods actually dominate dominates the you know intra industry trade globally as emphasized by you know Brulhart in 2008 paper; in Marini in 2017 paper.

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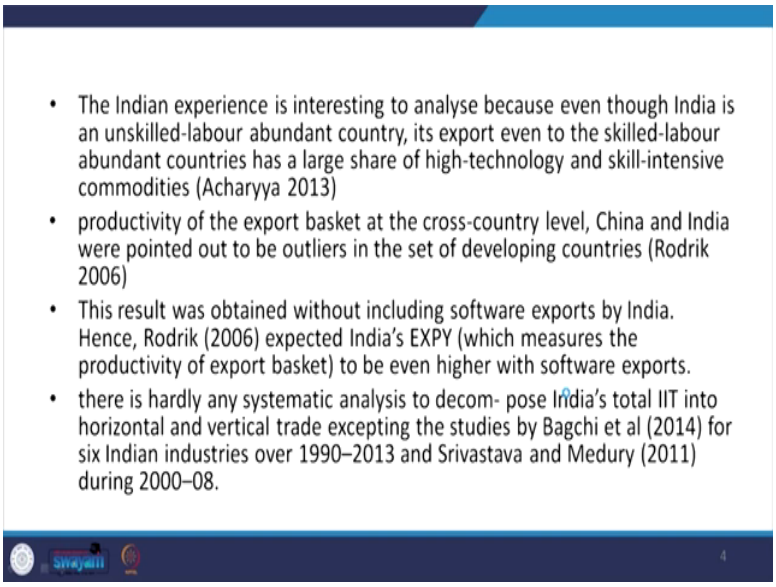

Similarly, in Indian experience it is quite interesting to note because of the fact that though India is famous for high amount of unskilled labour or the labourers are quite unskilled in Indian context. But its exports are actually not you know unskilled type is the export and its value are of skilled variety specially in the software you know segment. So, so it has you know larger share of high technology and skill intensive commodities as also mentioned by Acharyya in 2013 paper.

So, productivity of export basket at the cross country level China and India were you know pointed out to be the outliers in the set of developing countries mentioned by 2006 paper of Rodrik. So, what is important here to note that software's export as I just mentioned is more important for I mean more crucial for India and India actually you know harness the benefits because of the software segments. Also as mentioned in Rodrik 2006 paper India's EXPY

which is basically the productivity of export basket is actually unevenly higher because of the software segments.

So, there is hardly any systematic approach yet mentioned which decomposed actually the total IIT into different you know categories like horizontal or vertical. So, following the papers of Bagchi 2014 and which used 6 Indian industries over 1990 2013 papers; Srivastava and Medury paper 2011 during 2000 to 2008 actually discuss about the decomposition of IIT, intra industry trade to horizontal and vertical IITs.

One case study maybe you know emphasize here for an anecdotal understanding of horizontal versus vertical IIT differences; if we take the you know example of passenger car industry. Whereas we know that you know that passenger car industry actually assembles variety of you know segments, variety of small firms are actually attached within the larger industry called passenger car.

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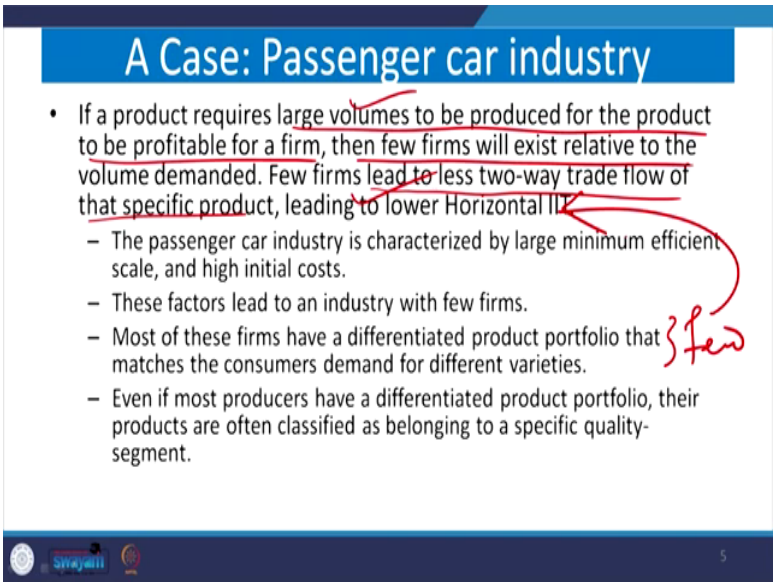

Now, one important point to be noted here if a product requires large volumes to be produced for the product to be profitable for a firm, then few firms will actually exist relative to the volume demanded. So, and these few firms actually lead to two-way trade flows ah. Since large volumes to be produced for this kind of industry few firms are attached. So, therefore, this lead to two-way trade flow of that specific product which actually leading to lower IITs. So, lower horizontal IITs which is quite important to note.

The passenger car industry is actually characterized by large minimum efficient scale and high initial cost. And these actually factors lead to industry with few firms which I have just mentioned most of these firms have a differentiated you know product portfolio that matches the consumers demand for different varieties.

So, this has led to actually very few firms and few firms is a matter concern for the understanding of lower horizontal intra industry trade. If even if most producers have a differentiated product portfolio, their products are often classified as belonging to a specific quality segment is you know passenger car industry. So, now, concern here is when we are trying to assemble the products to have a segment that will differentiate consumers taste or the products for consumer taste we will actually end off with very few you know suppliers.

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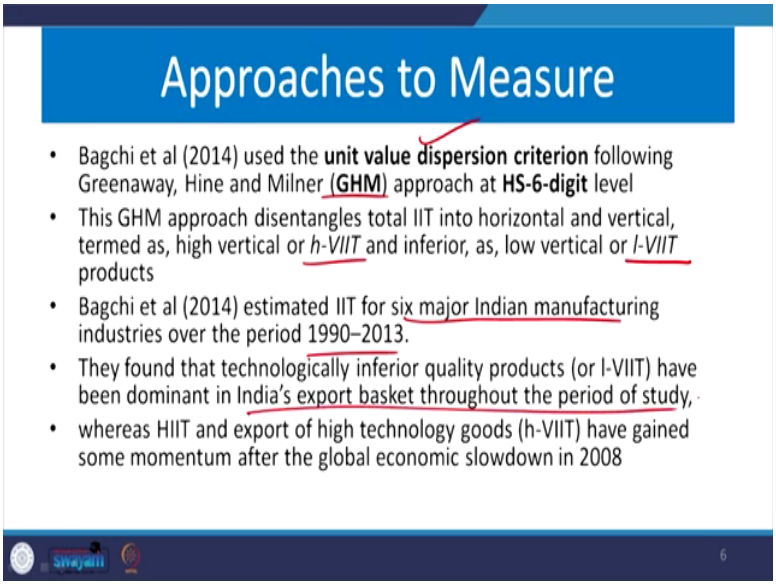

So, there are concerns for lower horizontal you know IIT. We will clarify what is called horizontal IIT. So, let us discuss once again that what kind of approaches are yet mentioned in different papers. So, Bagchi 2014 paper use unit value dispersion criteria we discussed this slide earlier in the previous lecture. So, I am not emphasizing here much on this. So, this is

famously known as I mean this is a back to you Bagchi paper used the Greenaway, Hine and Milner paper GHM approach using HS 6 digit level.

Now accordingly the you know lower vertical IIT or higher vertical IIT is actually classified based on this approach. So, they talked about 6 Indian 6 major Indian manufacturing industries over the period 1919 to 2013. They found that technologically inferior quality products specially the IV double IT have been dominant in Indian export basket throughout the period of the study.

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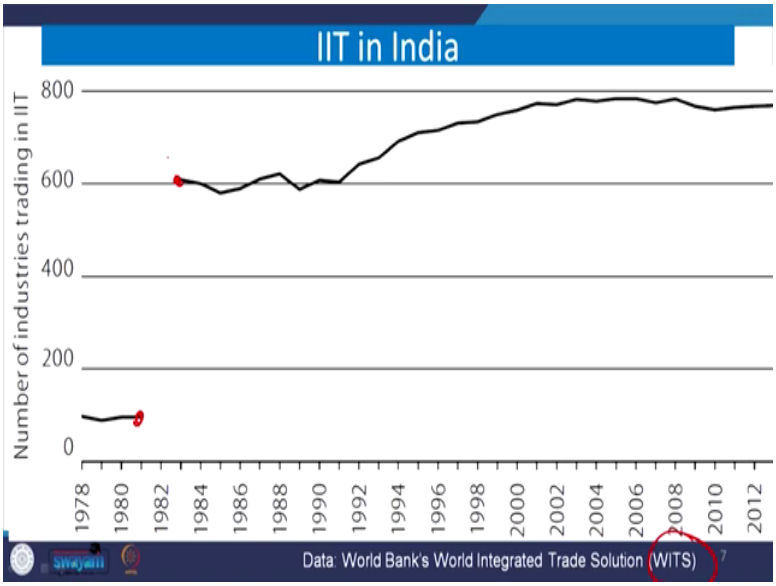

Whereas, horizontal IIT and export of high technology goods have gained some momentum after specially you know 2008 from the crisis period recent crisis period. Now, looking at the latest figures of India's intra-industry trade; now you can easily find out the you know the

percentage rise in different years these are the data from world intellectual integrated trade solutions by World Bank.

Yes these are as per the latest figure available in that dataset. and there is a gap here because of unavailability of the of you know cases related to intra industry trade. So, therefore, calculation has not yet been made. Now, so, here the chart discusses about number of industries trading in related to intra industry trade which is quite important.

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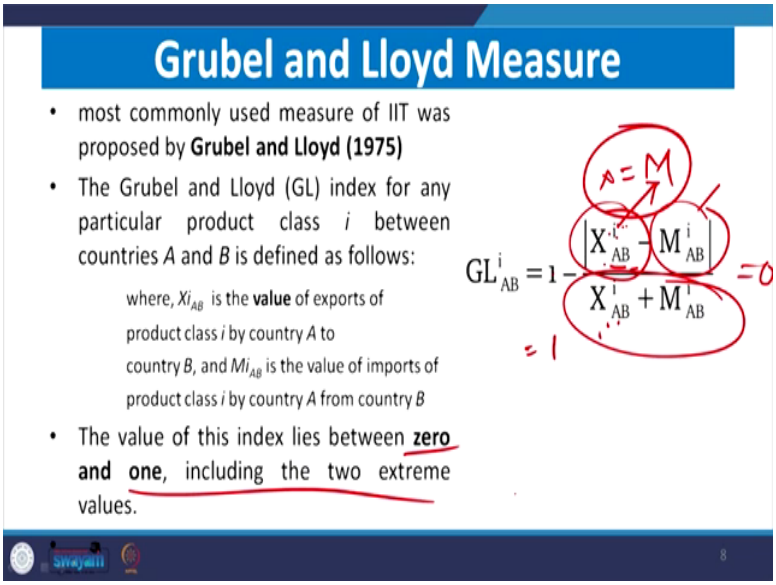

So, let us move on we have already discussed this earlier so I am not discussing further. The famously used technique for understanding intra industry trade Grubel and Lloyd; Grubel and Lloyd in 1975 as per the following formula. We have already discussed let me quickly mention the formula here.

Now, this is broadly country from A to B. A to B for exports of the i th i th particular you know unit or i th industry. And the import of from the you know another country to country B, I mean A to B out of the total trade total trade on the you know denominator.

Now this broadly measures the value of intra industry trade as I already said if it is the same industry like you know in the same industry if it is export only not import. That means, you are not actually receiving any import of any content on the same industry; that means, import will be zero and this will be only you know exports. So, export divided export is equal to 1 so, 1 minus 1 equal to 0.

So, when it is 0; that means, you know there is no question of intra industry trade, it is only in inter industry trade. On the other extreme case when the same industry is actually producing certain output and those output actually you know made possible due to 100 percent imports of the same varieties or the raw materials; that means, export is equal to imports through the through the you know raw materials.

So, these numerator segments is actually 0. So, one minus zero is equal to one. So, extreme values are zero and one. So, zero stands for no intra industry trade and one stands for full intra industry trade in the extreme I mean I mean in this context. So, there are intermediary values and can be emphasized.

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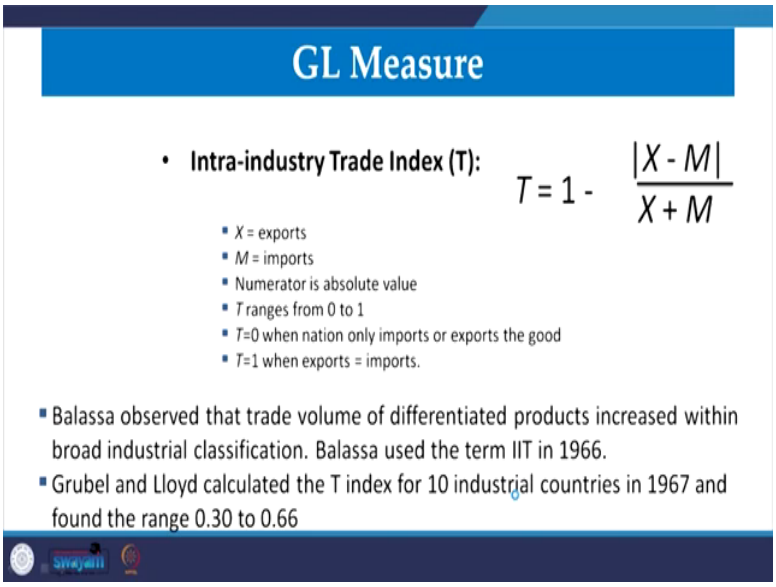

One of the, but I mean shortcomings of this particular method G GL method is mentioned by other approaches is that I need not emphasize, I already discussed this is that you know I did not talk about the trade balances because it has taken the absolute value.

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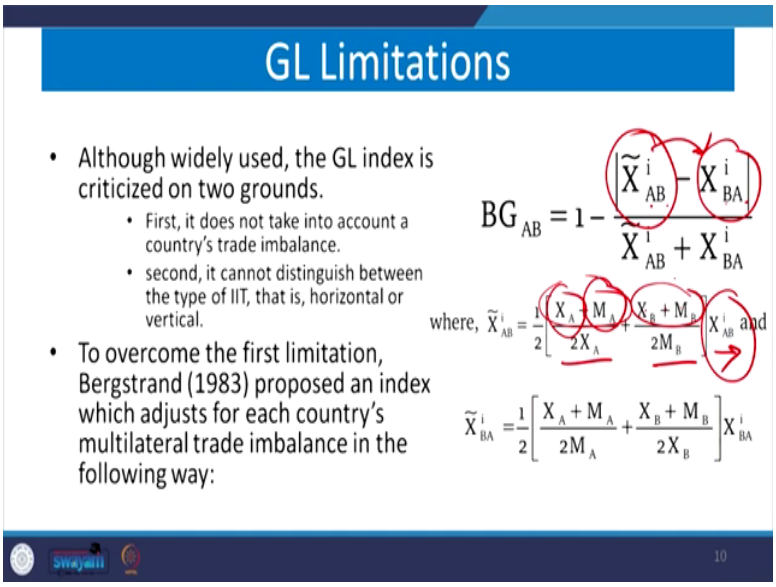

So, in that to it no had differentiated horizontal or vertical approaches of measuring intra industry trade to overcome these limitations one such approach was adopted in 1983 paper by Bergstrand this is famously called BG index BG index is actually be different than that of the earlier one. It captures the captures the trade imbalance, especially it is not export to import you can mark the differences.

Now, it is specifically differentiating the export from A to B, but here it is export from B to A of i th industry. Now what is A to B? It is average measure of export of A, import of A divided by twice of export plus export of B export of B; I mean it is with the total trade of country B is the total trade of country A out of their total imports in country B. And this side is the total export total trade basket out of the double of total exports and its average. What is

the net you know flow of goods and the rate at which, I mean the direction at which it is multiplied with that of the average of trade flows.

Now, nowhere it is actually creating problems with trade imbalances. So, therefore, the approach is little advance. And so the I mean this is the approach is clearly emphasizing certain direction towards under clarifying the trade imbalances issues which was not which was A criticism to the earlier approach.

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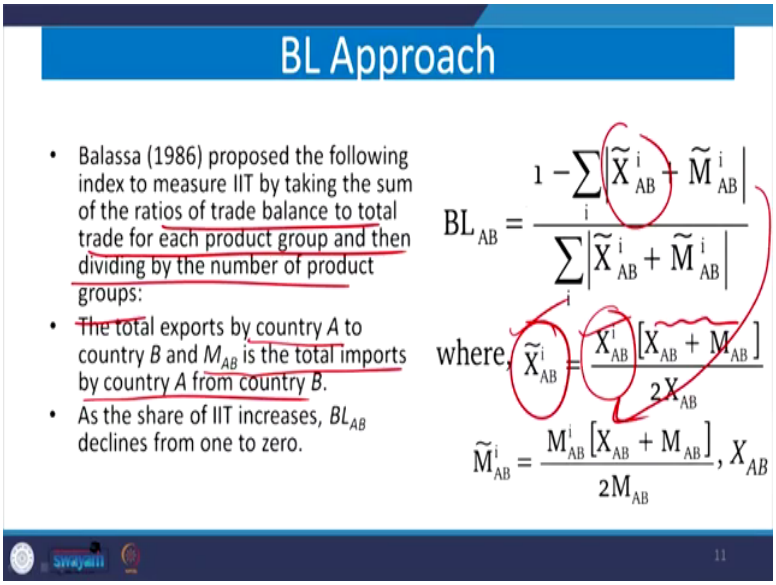

Another approach mentioned by Balassas in 1986, an index which actually take the sum of the ratios of trade balance to the total trade for each product group and then dividing by the number of product groups. Now, this is clarified through the following approach; I mean it is not exactly similar to the GL approach neither the BG approach.

Now here it is it is mentioned like this instead of taking it 1 minus it has taken on the numerator itself it has taken the net imports net rate from the 1 minus of the net rate. Now, what is this X export A to B? Which is actually of total trade from A to B export plus imports. Out of the twice of exports; that means, you know what is the volume of trade by doubling the I mean out of the double of exports time they.

Now the rate at which actually the trade is having certain direction to us A to B; We already discussed this A to B and its direction and if you are multiplying it we will find out the you know X the X direction from A to B of i th industry. By following this method we can find out one thing for sure the total exports by country A to A to you know country B and total imports A to B is the total imports by country A from country from country B. As the share of IIT increases is the share of intra industry trade increases, the Balassas index as proposed by Balassa in 1986 that BL A B declines from 1 to 0. And similarly we have already discussed for export direction and the import content can be also followed from the equation here.

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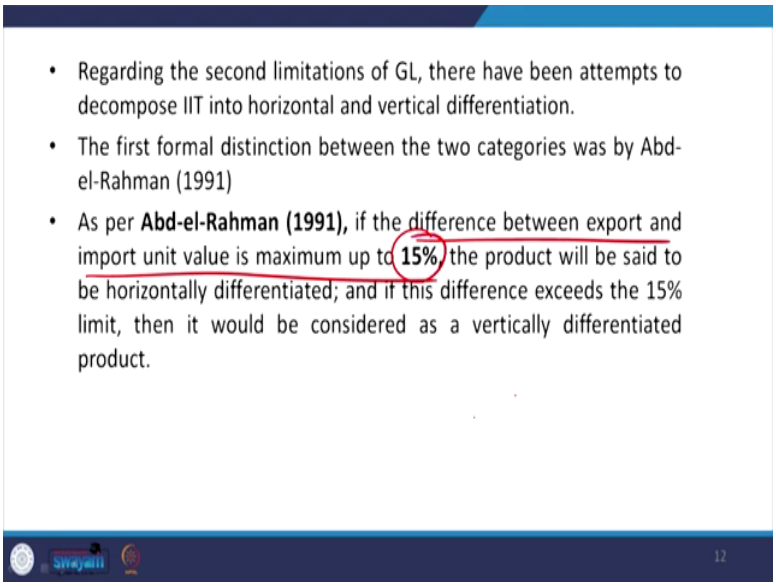

Now, let us move on to clarify the regarding the second limitations of the Grubel and Lloyd index Grubel and Lloyd index which actually emphasized I did not talk about horizontal versus vertical differences is actually discussed in this approach by Abd-el- Rahman paper 1991. They initially categorized and they talked about in their 1991 paper the difference between export and import unit value is maximum up to 15 percent the product will be said to be horizontally differentiated.

When the export or the import value is differentiated by less than 15 percent and or if it is exceeding 20 25 percent I mean if it is exceeding 15 percent, then we will interpret as vertically differentiated. Or if it is less than 15 percent it will it is as per their suggestions that it should be defined as horizontally; integrated trades.

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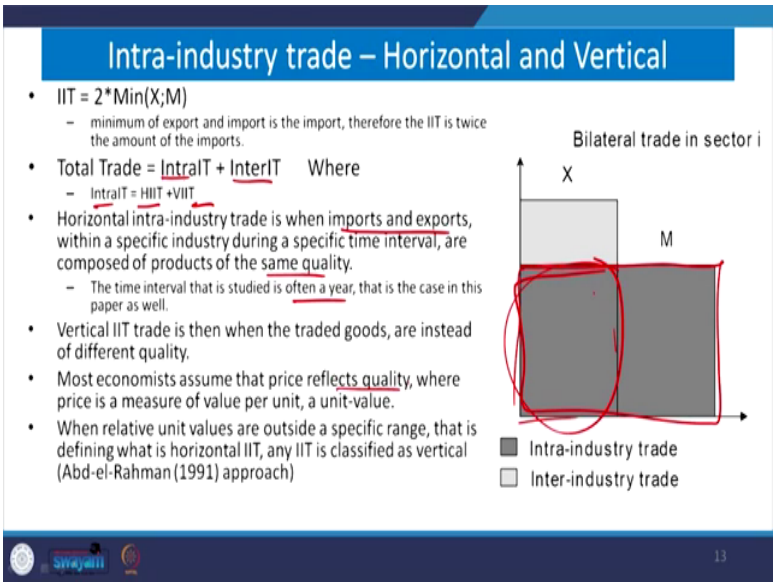

Now from this figure it is very clear that export and imports are actually overlapping with these this portion. And one of the suggestions by certain experts that the minimum of export and import is the value called intra industry trade. Since this is the minimum one at this level whatever the amount is there will be considered as intra industry trade and so therefore, this is highlighted in this particular diagram.

So, IIT is nothing but twice of minimum of either export or import, this is you know export import just to make it twice that is the value of you know intra industry trade as a simple pattern of calculating intra you know intra industry trade you know discussion ah. So, total trade is equal to intra industry intra plus inter, where intra-industry it is compose of horizontal as well as vertical intra industry trade. Horizontal intra industry trade is when imports or

exports within a specific industry during a specific time generally 1year time period we take are composed of products of same quality.

So, time interval that is studied usually 1 year as I mentioned and vertical IIT is then when the traded goods are instead of different quality. Where in the you know horizontal one we are emphasizing on different you know specifications where here we are emphasizing the product quality. So, most economies assume that price reflect quality, and since therefore, price is the unit value of measurement. When unit values are outside a specific range, as we initially mentioned as 15 percent, if it is within the 15 percent we define as horizontal; if it is exceeding 15 percent, we define as vertical. Ah intra industry because there are higher you know overlapping if the overlapping is less than 15 percent it is horizontal ok.

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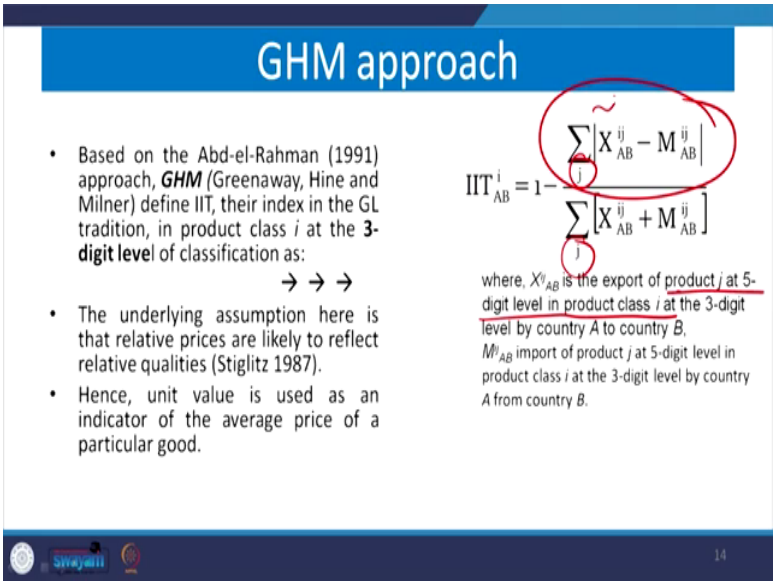

So, that was mentioned by you know Abd-el-Rahman in 1991 paper famously known as known as GHM approach Greenway, Hine and Milner approach. They define the index called they define the index by modifying the GL approach or GL traditions in 3 digit level classifications. The equation is mentioned here, they mentioned with slight changes to it.

Now the changes are you can follow it off your the j instead of mentioning like this I mean instead of defining that, they simply I mean further simplified that they have taken their all possible j th industry. What do you mean by j here? j is a j at 5 digit level in product class i. So, if the product class i is defined at 3 digit product class and from country A to B. You know what is the particular j th industry within the 3 digit you know classification.

So, we can also modify two other digit classification, but once we are sticking to a classification we have to actually restrict to that while calculating with another countries and its flow of export or import. So, here we actually mentioned clearly for the j th industry and their connection with the trade. So, no where we are actually having the problem with the trade imbalances; because, we are only sticking to the j th classification j th industry or of the i th class. So, therefore, there is no problem at all.

Now, the underlying assumption is here is that the relative prices are likely to reflect the relative qualities as mentioned by Stiglitz 19 1987 paper. So, unit value use as an indicator of the average price of the particular good.

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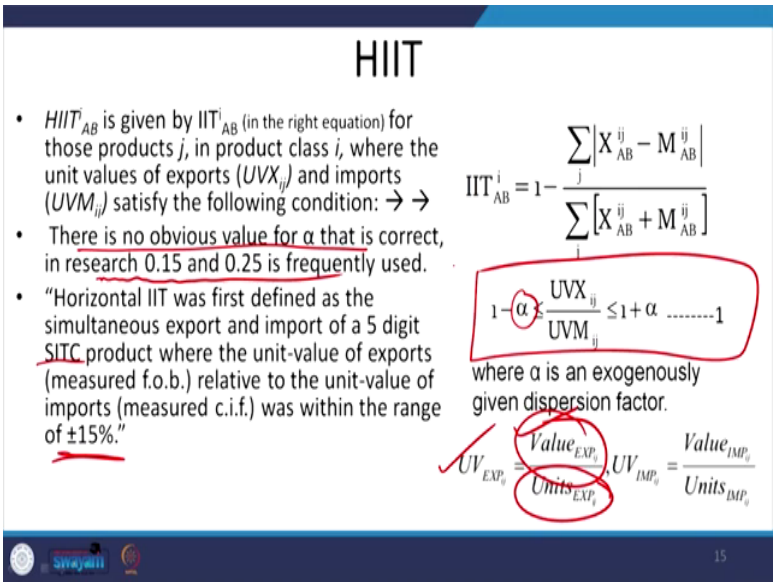

So, what do you mean by H double IT? Once again it is as I said clarified through a unit value of exports, UVX stands for unit value of exports. And there are some limit given alpha represent certain benchmark level, benchmark level with the variety of instrument mentioned in different papers, they found that unit value of you know exports is very important for calculation. So, there is no obvious value for alpha as mentioned in different paper.

So, usually the I mean in different papers the amount value I mean the alpha varies from 0.15 to 0.25 and so therefore, this indicator is actually frequently used. Now standard industrial you know trade classification SITC you know classification of 5 digit level, used in different majors by different expert they therefore, contain with a limit called plus minus 15 percent. So, therefore, 15 percent if it is less than 15 percent then it is actually horizontal otherwise if a exceeds, 15 percent it is vertical.

Now if now our concern is what do you mean by unit value? Is nothing but value of the exports of j th industry of i th classification. So, basically the particular value out of the total exports or total exports our total units exports and here on the numerator where mention the value of that exports. So, that therefore, it is called you know unit value measurement, unit value dispersion method.

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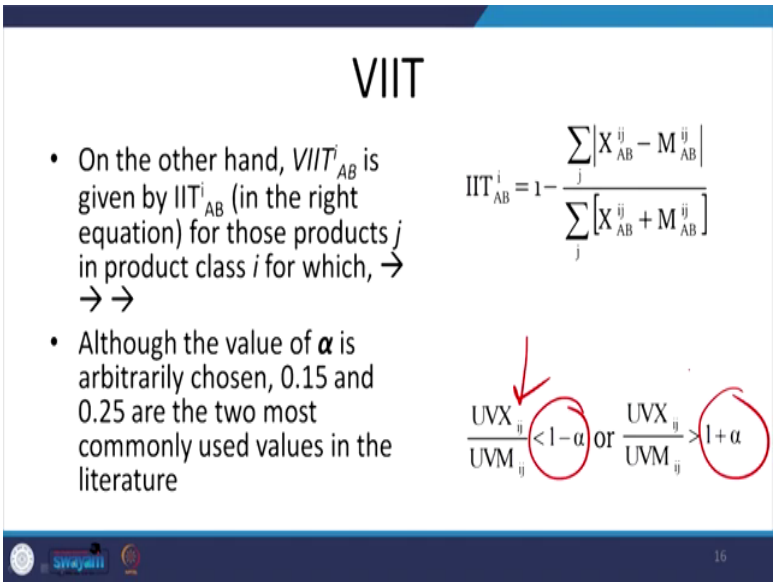

Now, based on these indicators facts are derived. Now we here mention that in order to define vertical intra industry trade either the limit is mentioned at suggested by a different experts either it will be less then this limit or; that means, 1 minus 0.15 or it will be more than that limit. If either of the direction is are not followed, that basically in the intra industry trade this as the limit if this is followed then clearly we define the intra industry trade to be horizontal. If

it is exceeding that; that means, you know we are having with intra you know vertical intra industry trade.

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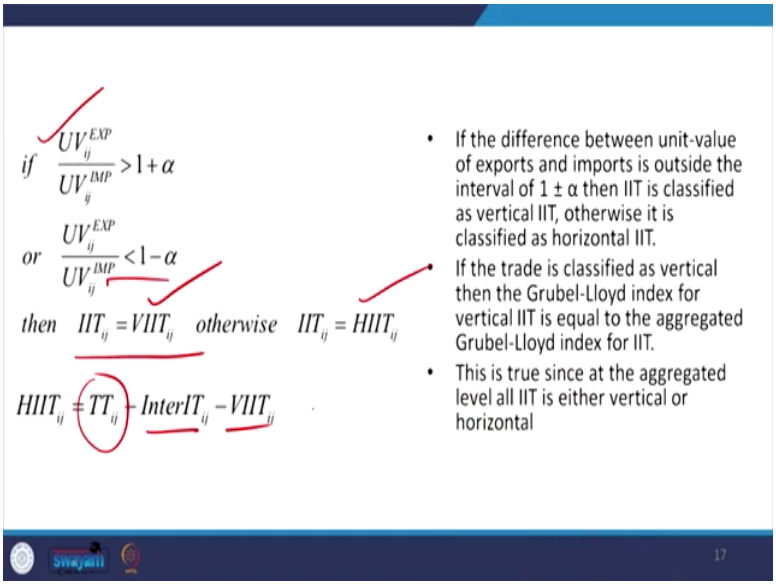

Now, further if; that means, you know if the unit value dispersion is exceeding 1 plus alpha or it is this indeed. Then IIT on the aggregate is called you know vertical intra industry trade, otherwise if it is not then IIT is nothing but called horizontal intra industry trade. So, horizontal industry trade is nothing but total trade minus intra industry trade minus vertical intra industry trade.

Now, I think I have already explained this further to add to the discussion of horizontal versus intra industry trade. If the trade is classified as vertical then the GL index we discussed earlier for vertical IIT is equal to the aggregate IIT as we already discussed.

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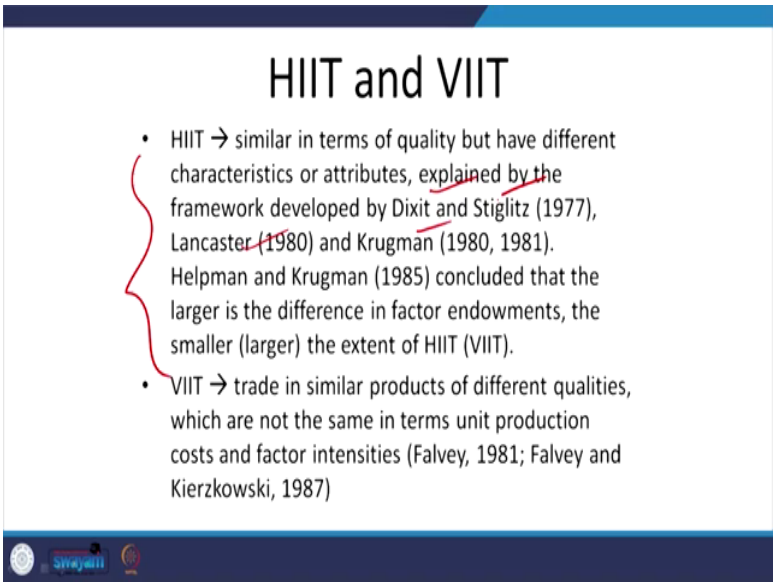

Therefore, the this is true since at the aggregate level the IIT is either vertical or horizontal. And there are Gamut of you know understanding related to the clarifications for HIIT and VIIT emphasizing Stiglitz, Lancaster, Krugman I need not mention this is the one I discussed the earlier lectures.

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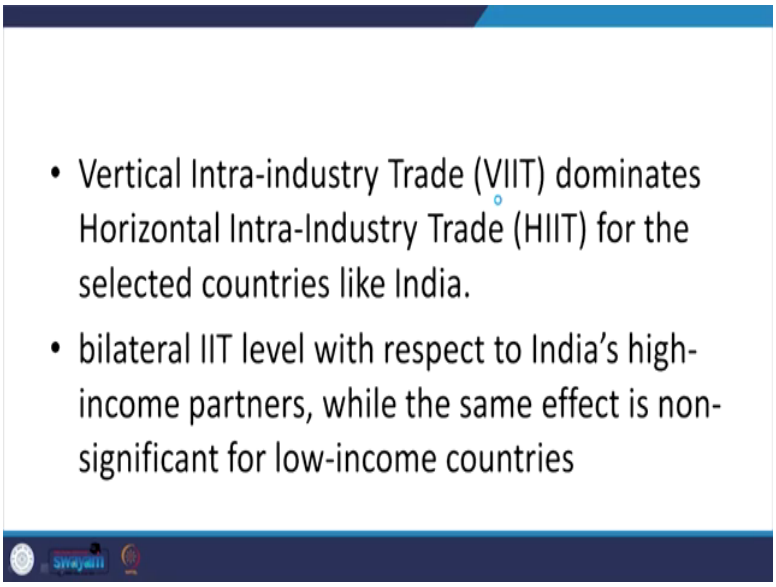

Now, a bilateral IIT level with respect to India's high income partners, while the same effect is non-significant for non low-income countries. The V double IIT, specially vertical you know intra industry trade dominance H double IT for select that countries like India in the present days trade.

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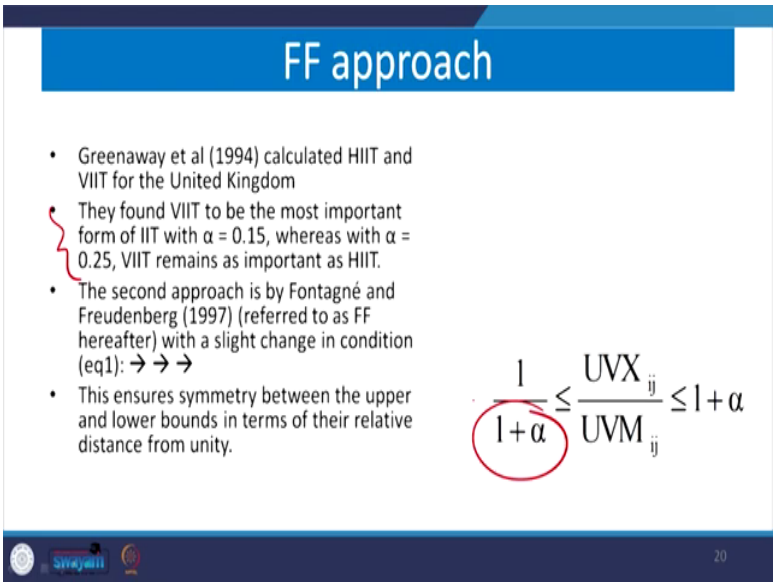

Greenway in 1994 paper calculated HIIT and you know especially for UK context. They similarly found alpha is significant at 0.15. And this is their equation you may follow it correctly, only slight change here is the take the change with respect to 1 plus alpha in the denominator. Rest are the unit value dispersion of exports and imports are same, we have already discuss, follow the PPT's and find out the differences.

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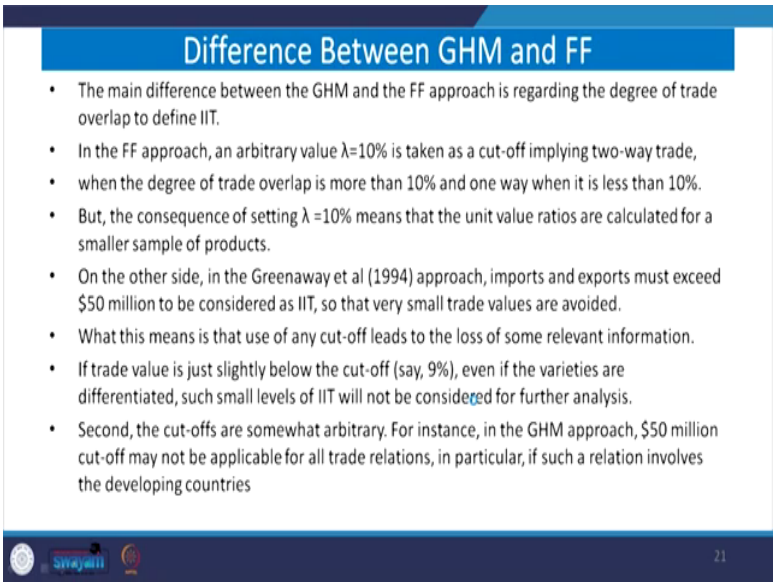

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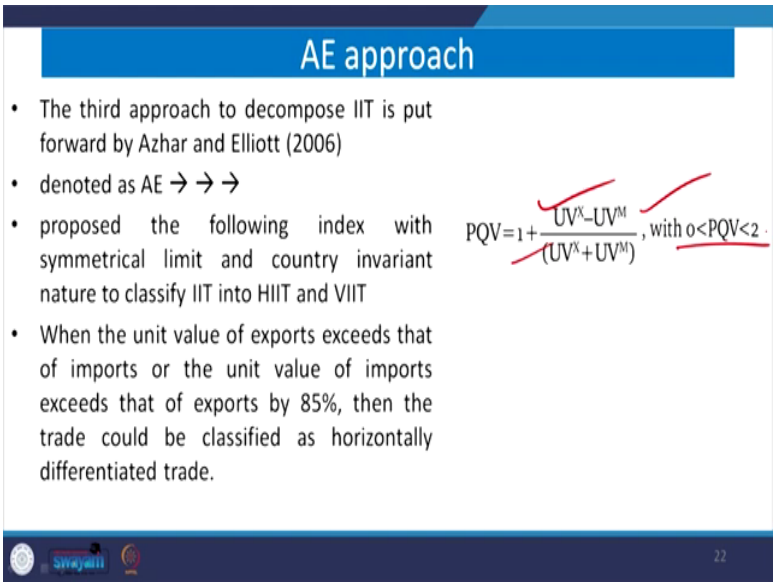

I will discuss the to point out here that if the trade value is just slightly below the cutoff that is 9 percent, even if the varieties are differentiated such small levels of IIT will not be considered for further analysis. Basically if it is too low we need not consider it. Here I mean the slide is all about emphasizing the GHM approach and FF approach. And there is another approach by a Azhar and Elliott, they decompose further IIT; I mean IIT to in I mean in this manner that 1 plus unit value of exports minus unit value of import. Again they have taken the net unit value to that gross unit value.

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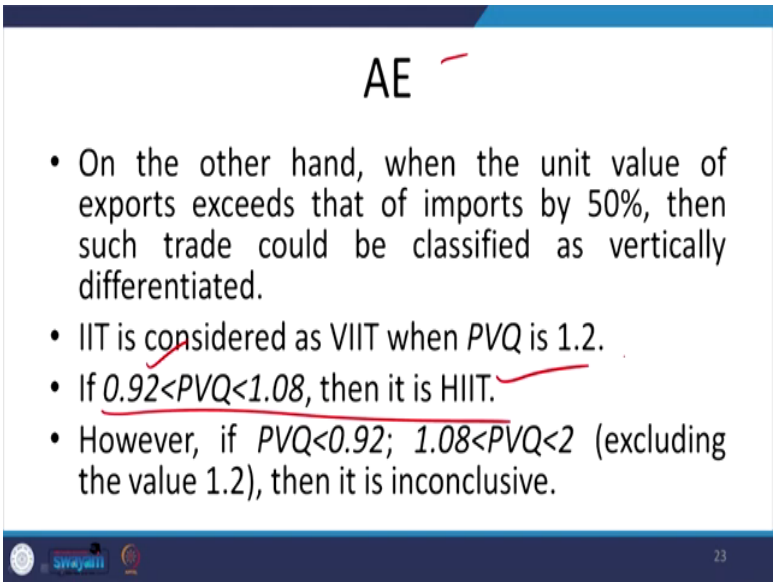

And the define the limit also based on different calculations, when the unit value of export exceeds that of imports the unit value of export imports I mean import exceeds that of exports by 85 percent then the trade could be classified as horizontally differentiated trade. I mean this is based on the AE approach, I think certain other benchmark are given, if I mean the exceed benchmark if it is 0.92 as per this approach within the limit of 0.08 then it is called H double IT otherwise it is V double IT. You can have a comparison accordingly with all the approaches I have already discussed.

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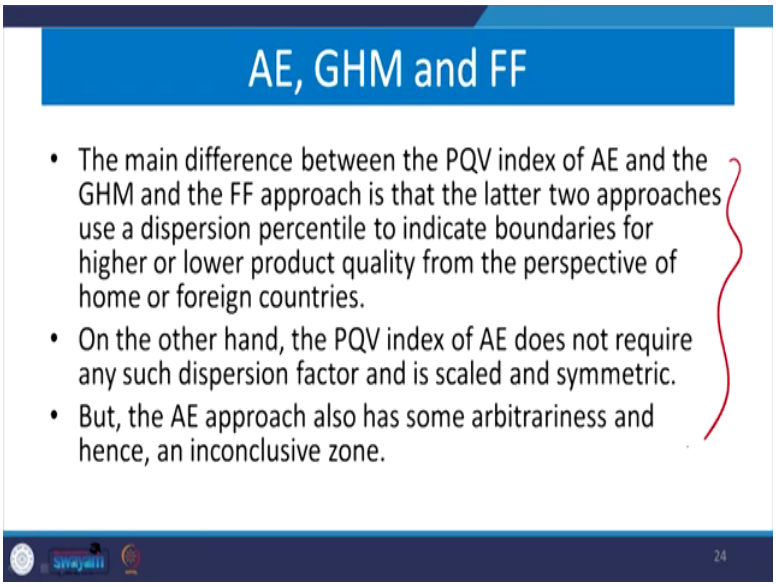

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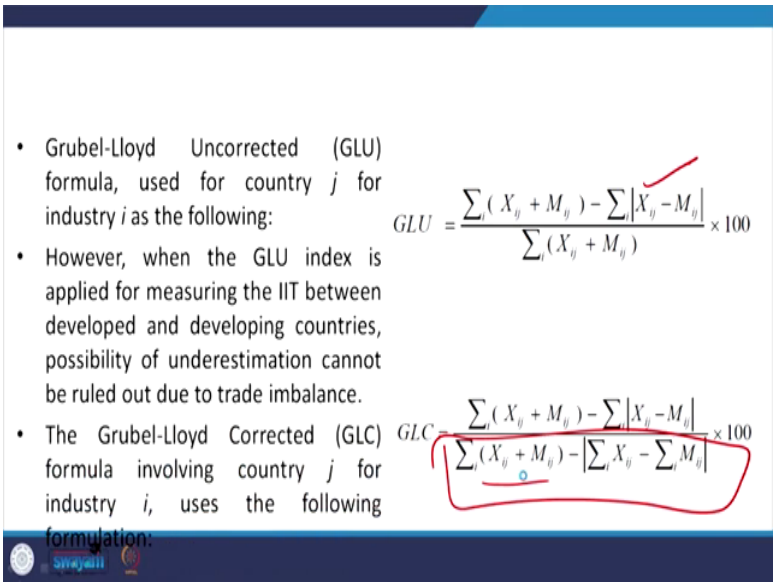

Now, last one to be mentioned as part of the you know as part of the understanding for measuring intra industry trade. Is through corrected versus uncorrected Grubel and Lloyd index is the simplest method. Here the net rate is subtracted, but there are certain problems of you know trade imbalances. So, therefore, here instead of taking these there are some changes, they corrected I mean they take taken the ratio out of you know adding this component. So, therefore, this is this is called corrected one you just follow it accordingly.

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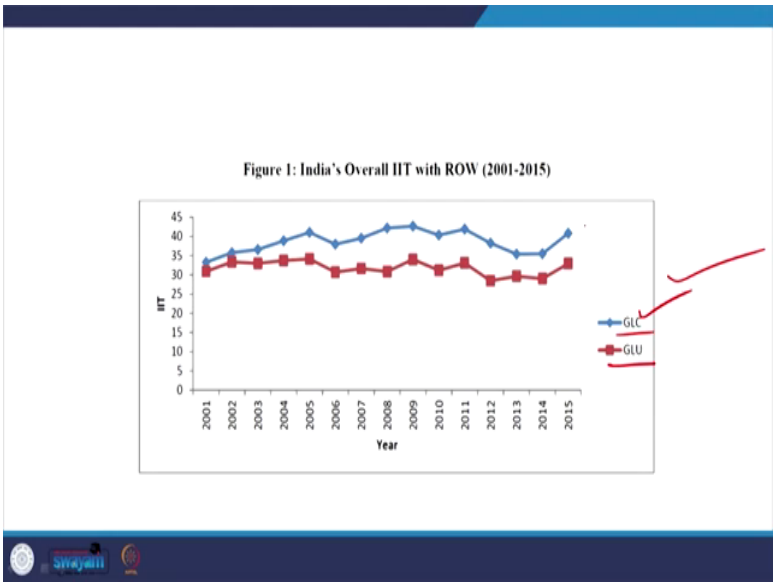

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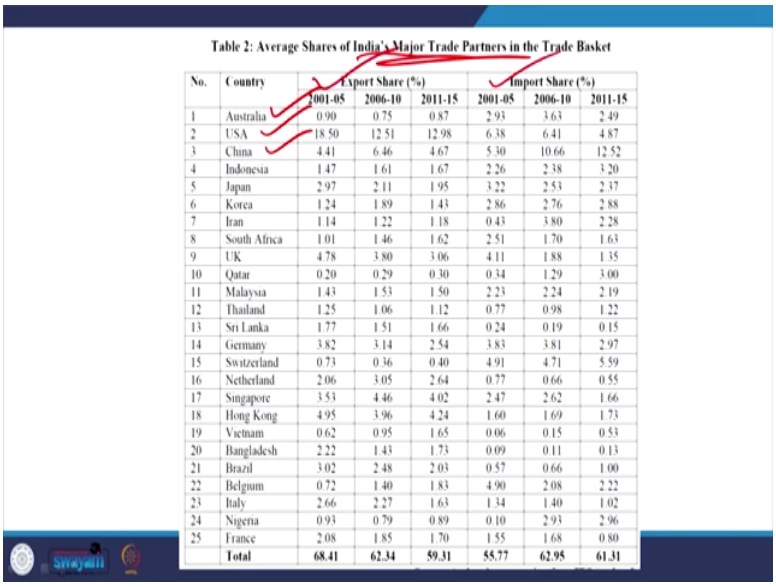

Table 2: Average Shares of India's Major Trade Partners in the Trade Basket

No.	Country	Export Share (%)			Import Share (%)		
		2001-05	2006-10	2011-15	2001-05	2006-10	2011-15
1	Australia	0.90	0.75	0.87	2.93	3.63	2.49
2	USA	18.50	12.51	12.98	6.38	6.41	4.87
3	China	4.41	6.46	4.67	5.30	10.66	12.52
4	Indonesia	1.47	1.61	1.67	2.26	2.38	3.20
5	Japan	2.97	2.11	1.95	3.22	2.53	2.37
6	Korea	1.24	1.89	1.43	2.86	2.76	2.88
7	Iran	1.14	1.22	1.18	0.43	3.80	2.28
8	South Africa	1.01	1.46	1.62	2.51	1.70	1.63
9	UK	4.78	3.80	3.06	4.11	1.88	1.35
10	Qatar	0.20	0.29	0.30	0.34	1.29	3.00
11	Malaysia	1.43	1.53	1.50	2.23	2.24	2.19
12	Thailand	1.25	1.06	1.12	0.77	0.98	1.22
13	Sri Lanka	1.77	1.51	1.66	0.24	0.19	0.15
14	Germany	3.82	3.14	2.54	3.83	3.81	2.97
15	Switzerland	0.73	0.36	0.40	4.91	4.71	5.59
16	Netherland	2.06	3.05	2.64	0.77	0.66	0.55
17	Singapore	3.53	4.46	4.02	2.47	2.62	1.66
18	Hong Kong	4.95	3.96	4.24	1.60	1.69	1.73
19	Vietnam	0.62	0.95	1.65	0.06	0.15	0.53
20	Bangladesh	2.22	1.43	1.73	0.09	0.11	0.13
21	Brazil	3.02	2.48	2.03	0.57	0.66	1.00
22	Belgium	0.72	1.40	1.83	4.90	2.08	2.22
23	Italy	2.66	2.27	1.63	1.34	1.40	1.02
24	Nigeria	0.93	0.79	0.89	0.10	2.93	2.96
25	France	2.08	1.85	1.70	1.55	1.68	0.80
	Total	**68.41**	**62.34**	**59.31**	**55.77**	**62.95**	**61.31**

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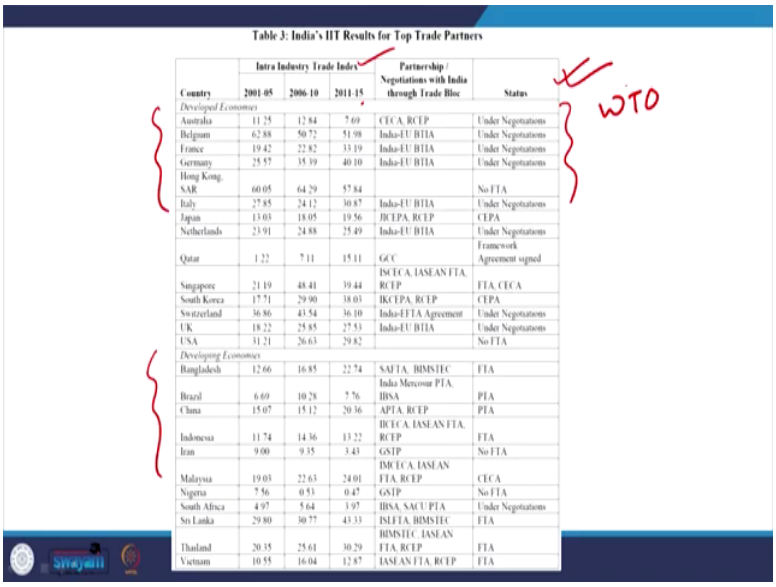

We have already discussed these facts I am not discussing further follow it this is for your understanding only, just to mention as a last minute discussion for this particular unit. That India is overall IIT as against rest of the world as per the 2000 and 2015 figure. The regarding you know corrected and uncorrected as per the corrected index it is actually higher than that of the uncorrected one.

Now, similarly average share of India's major trade partners in the trade baskets can be followed Australia you know India's major by as trade partners. Australia is highest, USA, China I mean so far as intra industry trade is concerned what are their exports here what is their imports here is mentioned we have already discussed.

So, and intra industry trade index is also given here for developing countries context for I mean developed countries context in developing countries context. And these are actually

based on with certain based on certain negotiations like you know like CICA negotiations India EU union bilateral you know negotiations. We discuss all they we will be discussing these details in the WTO negation chapters. So, so till then you may wait and accordingly prepare for the exams. So, with these I think stop here so.

Thank you so much.