Strategic Trade and protectionism Theories and Empirics

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Lecture - 17
Monopolistic Competition and Trade

Welcome guys once again for the trade modules which is you know purely targeted for understanding the strategic trade and protectionism from Indian perspective. So, therefore, the you know module is on theory as well as empirics, because you know empirics or the empirical estimations are not possible unless we understand the theories or basically the experts opinion in different time periods. So, it also attaches you know historical note on various you know aspects of trade.

And we have now landed into the week number 4 and lecture number 17. So, in this lecture, we are again streaming from the last lecture it was on you know increasing returns to scale and its connection to international trade. As we already pointed out you know in the last lecture there are the trade is not just confined with the assumptions of neoclassical theory, it is actually very much realistic with the production function which exhibits you know increasing returns to scale, but which was actually constrained or actually compacted by the neoclassical economists.

Based on these we are now unfolding the discussion on you know another very important market in the present day is called monopolistic competition and its connection with trade. So, in this lecture, we will be covering various features of monopolistic competition, and how this is responsible for qualitative trade or quantitative trade, but the strategies are of certainly different. So, myself Dr. Pratap Mohanty, Faculty Member in the Indian Institution of Technology, Roorkee, attach with the Department of Humanities and Social Sciences.

Now, let me proceed to understand the background of the monopolistic competition and why Krugman is famous for. So, let us count down what are the important features or the assumption by which Krugman's model which is based on monopolistic competition we already took off in the last class. So, once again I am attaching with the emphasize by

Krugman model on internal economy of scale, we also discuss external economy of scale. We will once again discuss in this session also.

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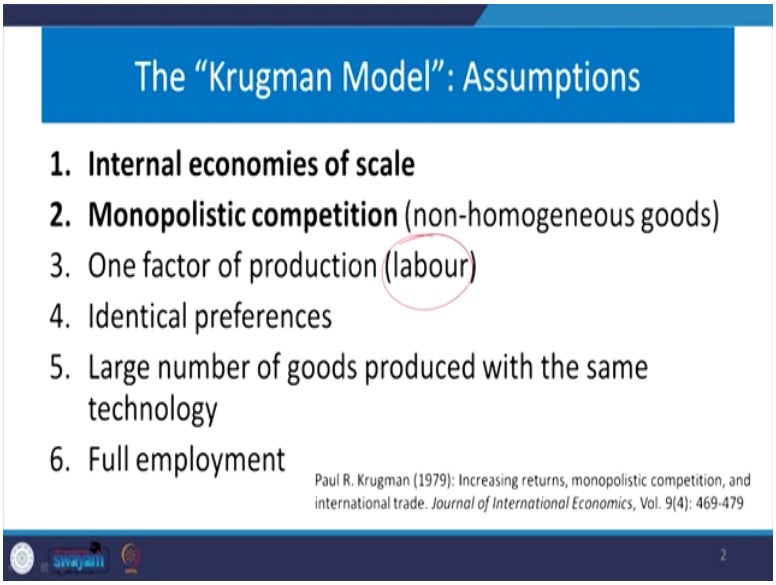

Besides that we will talk about monopolistic competition specially the products which are non-homogeneous in nature. And the other assumptions are like you know one factor of production that is labor, large emphasize also there relax with these one factor production with other factors of production. Identical preferences are assumed across countries, large number of goods produced with the same technology, and full employment.

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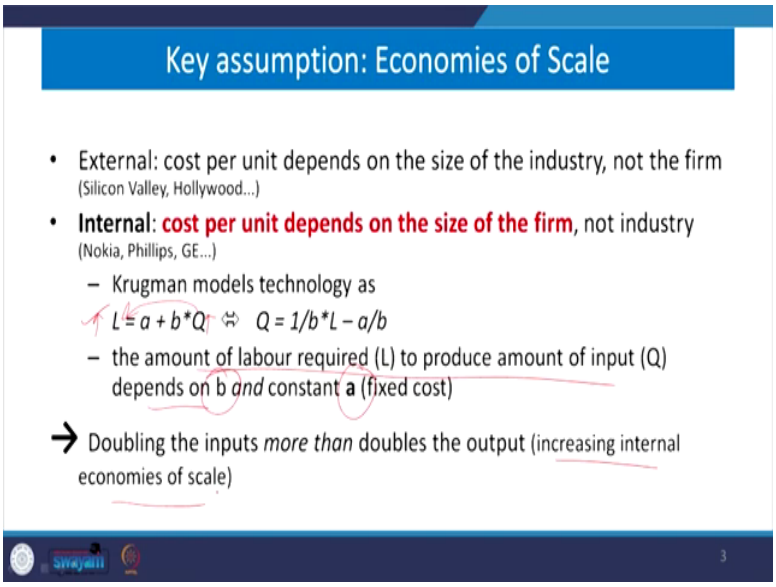

So, these are the assumption in the Krugman model. And some key assumptions are like internal and external you know benefits related to I mean basically the assumptions again related to economy of scale, the identified external as well as internal. External, they mean the you know economies or the minimization of average cost of production due to the increase in the size of the industry instead of firm. When we are sticking to form it is called internal economy of scale.

So, at the industry level, at the industry level to understand economies, some of the examples are like Silicon Valley if you remember in US, where Silicon Valley at large refer to you know the software companies. And all software companies developed because of an huge agglomeration in those locations and that we during that period. Similarly, Hollywood in US and in Bombay for example, financial capital, Bombay is the financial capital and because of

many financing institutions are actually located there, and accordingly many economies are derived that is largely due to external economies, and due to the industry as a whole growing.

Whereas, if you look at internal one like you know it is specifically for a single company, maybe you know maybe GE Electricals, maybe you know particularly for Nokia, maybe Philips or maybe ITC or maybe you know Infosys, they are I mean it is the internal economy or the internal firm which are responsible, the firms which are responsible in minimizing the average cost of production.

So, Krugman in short defined technology is if you know demand for labor it is given here demand for labor L is explained with a plus beta b times or beta times Q. So, if how much labor is demanded due to high demand for quantity. So, it is positively higher the production or higher the production higher the demand for labor. So, it is positive related.

Now, similarly you know, so how much if you express in indirect function Q is a function of labor. So, labor now the amount of labor required to produce the amount of Q depends on beta or b or a fixed coefficient as well as the you know the coefficient attach with the variable. And so and basically it is said or it is assumed or it is considered in these model that doubling the inputs result in more than doubling the outputs. So, largely we are referring to increasing returns to scale or increasing internal economy of scale in Krugman's model.

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Now, so let us move on we have already discussed, and these are largely you know understood you know from the microeconomics theory perspectives, those are already read can easily understand now, very quickly. Now, in the long run you know market equilibrium of monopolistically competitive market we know that monopolistically competitive market has so many you know features.

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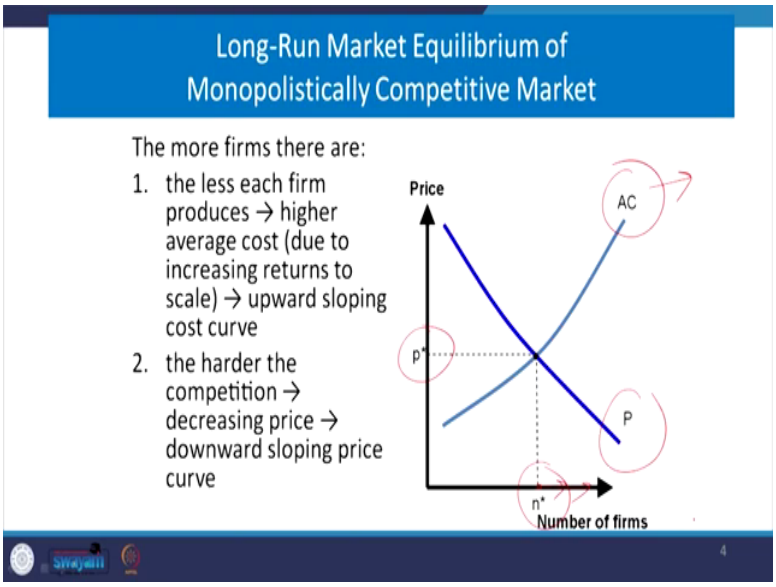

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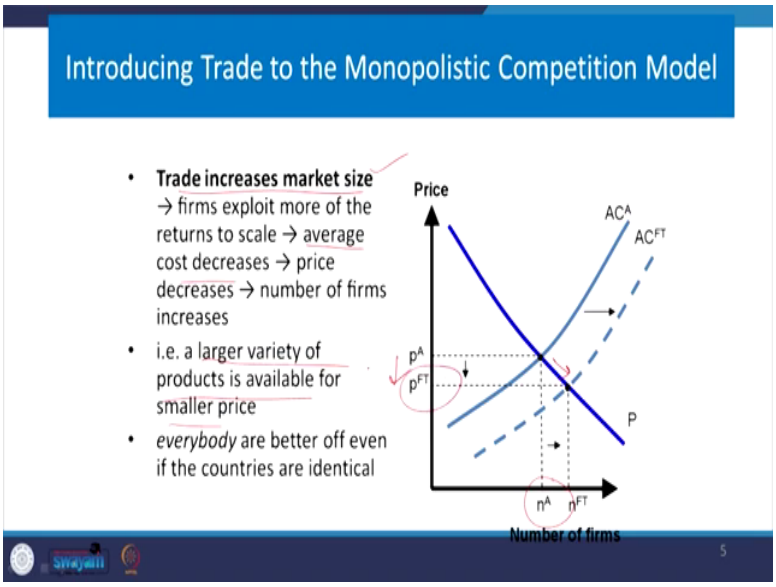

Now, I will just show it here. I will mix both the diagram together and discuss the monopolistic behavior as well.

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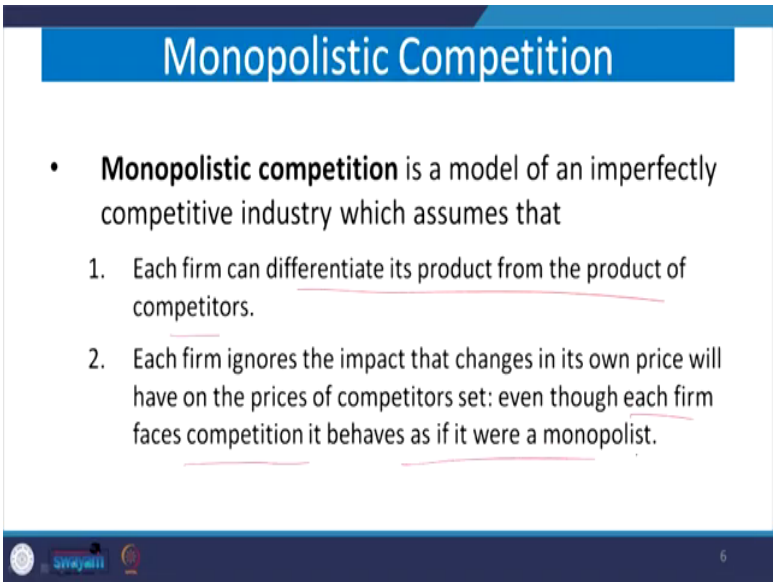

Now, in monopolistic competition specially it is an imperfect competitive market because of the differences in the product, and they are you know differentiates its product from the product of competitors. And each firm ignores the impact that change in its own price will have on the price of competitor set, even though each firm faces competition it behaves as if it were a monopolist, so that is precise in the features. Now, come back to the diagram, which were trying to refer.

Now what we try to say in the long run market, so they could able to since you know let this be the demand curve, this is the average of cost curve represent the supply curve or the supply function, and a precisely price is determined in the market and due to the number of firms. So, when the number of firms increases, number of firms increase, it is not referred to only single monopolistically competitive firm rather we are also referring to number of firms here.

So, number of firms increases, they could able to minimize their average cost of production specially when trade increases, because the market size increases firm exploit more of the returns to scale, and therefore, average cost decreases. So, we are referring to A number of monopolize firms. And the firms now reduce number of you know firms increases which resulted in increasing number of firms and reduction in average cost of production.

Since, it is the external factor that is trade minimizing the cost of production, so we are ended up with larger variety of products available at a smaller price. So, everybody are better off since the countries are identical and the products are an amply available with different varieties. Due to that average cost function due to trade actually reduces and that also shifts the equilibrium position resulting in price falls. So, average prices also falls, it creates for the scope of production as well as higher demand.

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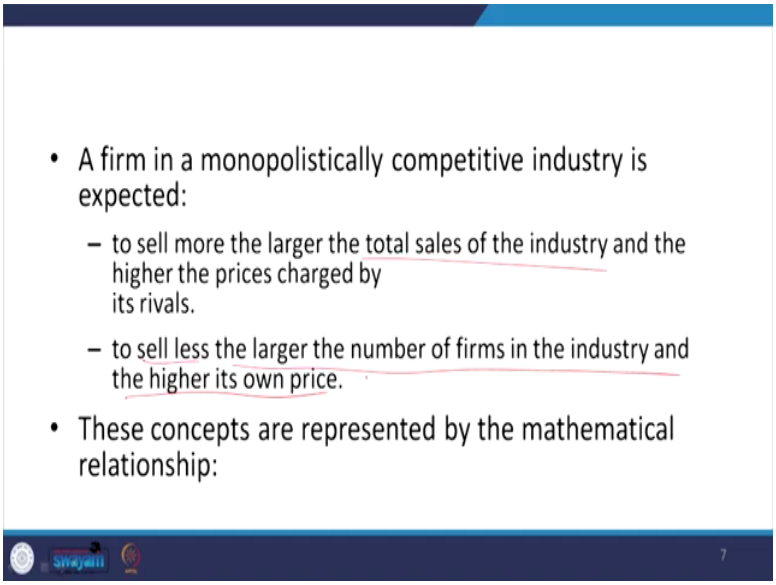

So, as we have already discussed these, now let us move on to understand certain other features of monopolistically competitive industry. So, what is really very interesting in monopolistic competitive market, it is expected from the industry that to sell more the larger the total sales of the industry and higher the price charged by its rivals. So, what they do? So, total sales increases basically the competitive market is attach with you know lower prices and than a higher sales.

To sale less, let to say less that larger the number of firms in the industry and higher its price. If higher its price, the sale decreases and the sale more if the reverse is true, so that is quite common in monopolistically competitive market.

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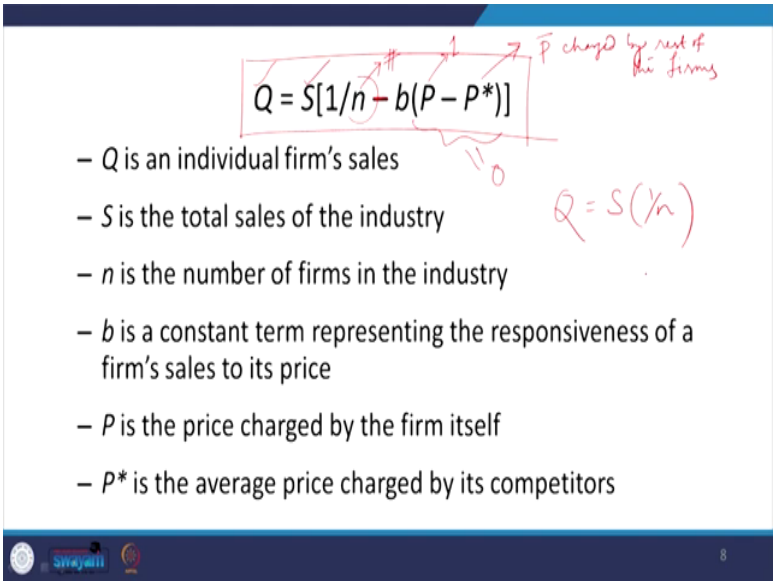

Now, we can explain it with a mathematical notation. So, here is the equation. The equation states that how a single firm can able to sell maximum amount of its own subject to various

factors. Now, factors are like total number sales in the whole industry given the fact that the Q stands for the quantity of the particular firm, and n stands for number of you know firms within the industry, and P stands for price charged by the 1 st firm, and P star and for the average prices, the average prices charged by rest of the charge by rest of the firms. So, it is obviously you know negative.

So, the net effect, net prices charge net price charged by the single 1 st firm is against others is actually negatively attached with its total sales, higher its net prices or net price you know the 1 st firm could able to sell little lesser. And then when the number of firms increases number of firm increases, since it is inverse related to each other, so the individuals here in the total market also falls.

So and beta is a constant you know coefficient representing responsiveness of his firm sales to its price, how what extent of responsiveness the individual you know firm has. Now, based on this quantity we can have you know different you know revenue and cost structures.

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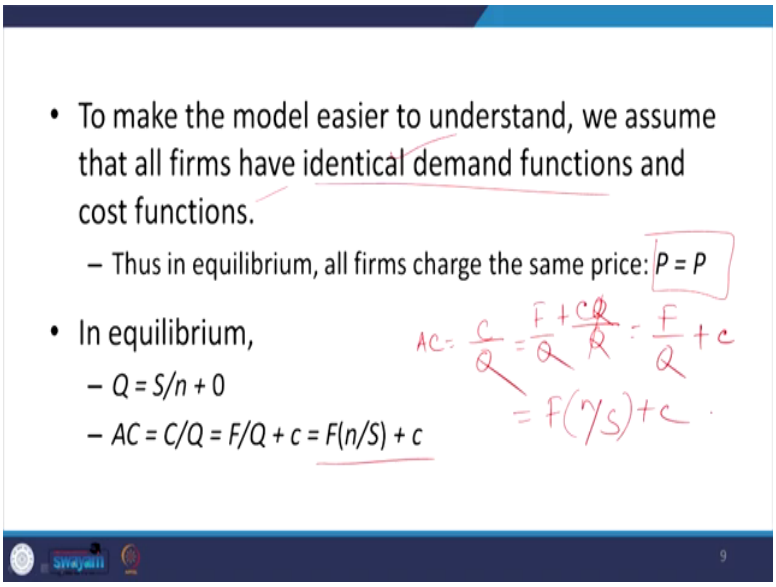

Let us see how you know firms are actually strategizing in charging different prices. So to make it easier further, let us say assume all firms are identical demand functions and also cost functions. Now, if they have identically you know demand function prices are expected to be same. So, given this these term boils down to 0. So, it ends up with S times 1 upon n. So, since the since they are the identical firms. Now, here so it is equal to 1 upon a, so it is basically S by n.

So, number of you know total sales divide a number of firms within the industry. So then what is the average cost given in the fact that they have identical cost function and identical demand function, the average cost will be since you know average cost is equal to total cost divided by quantity. So, it has a components of fixed cost plus variable cost. So, fixed cost divided by quantity, so let it be quantity.

So, this is you know C Q by Q, Q, Q. So, Q, Q cancelled which is equal to F upon Q plus small c that is average variable cost. So, this is the n. So, what is it is equal to, then F times, so we have already seen it is Q is equal to S upon n. So, S upon n, so it equal to just the reverse n upon capital S plus small c. So, this is what it so far average cost is defined for a firm being attached with a monopolistic competitive market.

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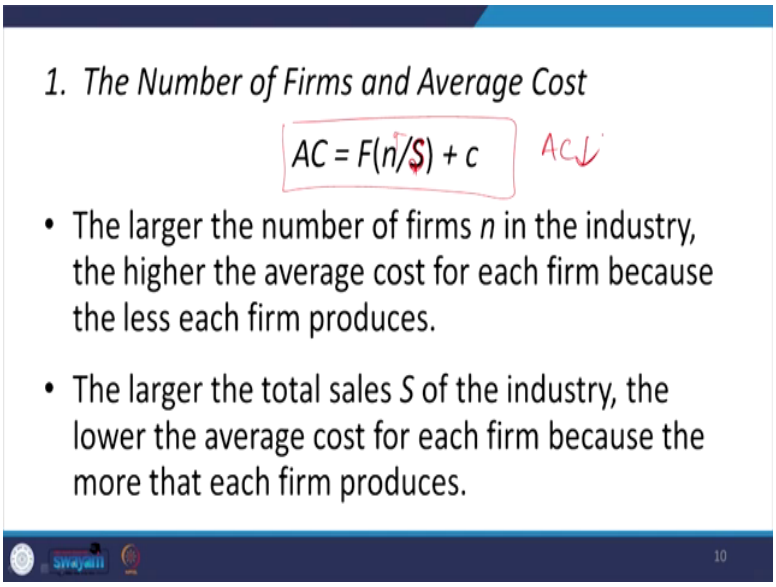

Now, the number of firms in the average cost we have already defined just now. So, average cost is defined like this. So, therefore, the larger the number of firms, now what is understood larger the number of firms when n increases, n increases in the industry higher the average cost for each firm, because the less each firm produces. Since in a number of firm increases average cost actually increases.

Whereas, when the you know total quantity in the industry they are actually producing higher quantity not just by higher number of you know competitors, but the quantity is higher produced, so it is inverse related to the average cost. So, their average cost actually falls larger is the you know sales this actually falls, so which is very much you know realistic in a monopolistically competitive market.

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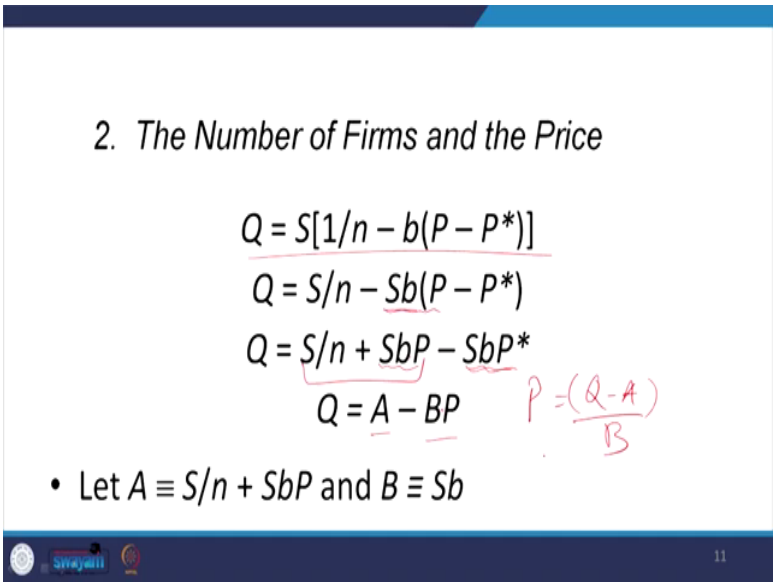

Now, let us examine the number of firms in the price the two component are also important. So, quantity once again you know we have already defined this in the equation. Now, this quantity is defined a let us multiply S everywhere. So, S times b, and so S we are multiplying here, so it boils down to be S b times P on this one.

So, Q is equal do is upon n plus, now let us you know explain further by multiplying these two each of the component decomposite correctly. So, these are the two further components.

Now, put it putting it this equation differently now Q is equal to A minus B P, A stands for this whole this, S upon n plus S b P. So, this is the first component A, and this is the B stands for S b. So, b times P. So, what is Sb all about, this is basically the total you know quantity produce in an industry as a whole times the prices average price in the whole industry.

And this is basically first component is all about the fixed component in the linear equation, which says that which states that the quantity of the particular firm times its price, the I mean quantity of the total industry times the price charged by the individual firm and times the per capita quantity in the industry. Basically, this is first latest to the first individual you know individual firm, second latest less to the others.

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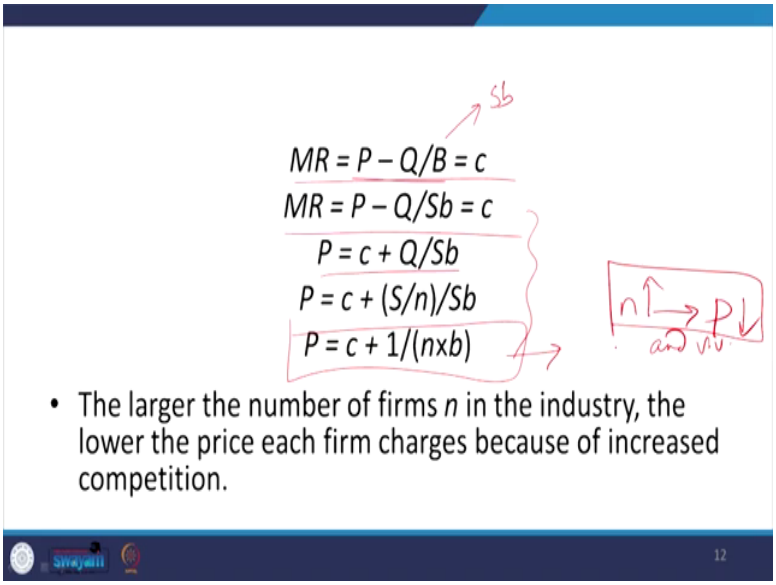

Now, based on this we can define MR – Marginal Rrevenue. So, how do define marginal revenue marginal revenue in is nothing but the price you know price income perfectly

competitive market. Now, here we can define the marginal revenue just by multiplying you know multiplying P, P here, c or taking P this side, P this side, and you know just exchanging P here like the P is equal to Q minus A divided by B.

So, now P into Q, so this is basically equal to P into Q, and this will goes down to Q square b minus you know Q A, so that way you can define it now again after taking faster derivative will arrived into the marginal revenue. So, from that equation we can express in it in terms of price. So, this is nothing but simply the price divided by the you know by P minus Q B Q upon B, which is also equal to its marginal cost ok, and in monopolistically competitive equilibrium.

Now, so marginal revenue is equal to now express Q you know B express that B is B we already defined S b small b this is equal to this. So, P is equal to small c plus Q upon b, I mean Q by Sb just is by you know exchanging the equation we can find out this we can arrive here now. So, price, so Q what is Q S upon n divided by S by b just you know exchanging these notations will arrive into these particular equation, which is largely attaches its relationship with marginal cost and marginal revenue, not the prices in the market.

So, how the price is determined? So, price is nothing but defined as c plus small c plus 1 upon n times b. So, what is a larger the number of firms, larger the number of firms in the industry, lower the price since it is inverse relate in is inverse related to P, so because the increasing increase in the competition within the monopolistic setup ok.

So, this is largely defining the relations relationship between n and P. So, when n increases, this decreases, and vice versa, and vice versa. So, this inverse relationship is one of the important features of monopolistic competition. So, it is responsible for minimizing the average prices in the market. So, based on this number of interpretation can further we made.

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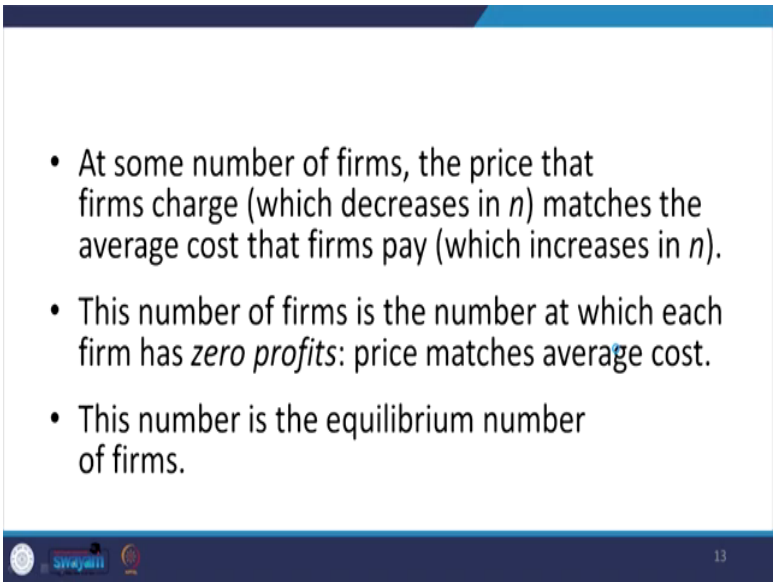

Like you know at some number of firms, the price that firm charge you know matches the average cost that firm pay. So, usually we know that monopolistically competitive prices are set at a very low level, but relatively higher than that of the competitive prices. This number of firms is the number at which each firm has zero profits, each firm has zero profits. So, price matches with its average cost. This number is the equilibrium number of firms which we just discussed.

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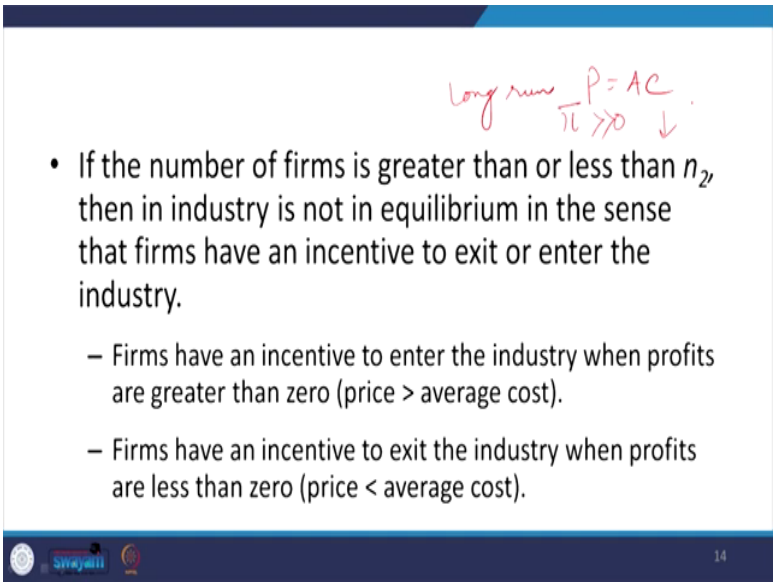

Now, if the number of firms is actually greater than or less than n or n 2, then in industry it is not in equilibrium, in the sense of firms have an incentive to exit or enter in industry. Basically, the long run setups which we are emphasizing on the long run monopolistically competitive market, where the price is precisely equivalent to the average cost.

And if it is if the profit earned by the marginal you know firms within the industry is positive or much, much higher, then outside will enter. And if they enter they will actually you know try I mean in the industry total number of quantity produced will be increasing, and therefore, since it is inverse related to price the price falls, and the those will be equated with the average cost to derive an normalize profit or normal profit.

So, this is what when price is greater than average cost, when price is less than average cost is clearly defined. So, monopolistic competitive market that mean the long run is more welfare attaching to these consumers also very competitive.

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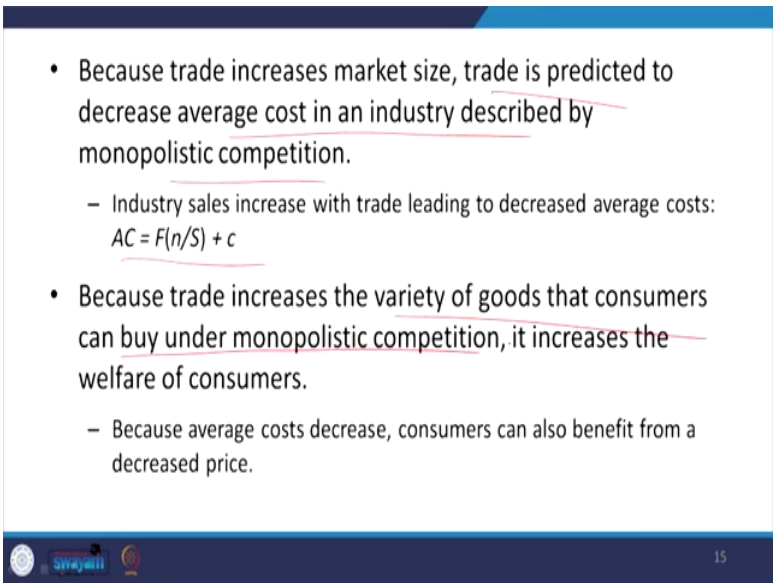

So, what we have discussed because trade increases market size, so trade is one sort of instrument which you know attaches to increasing competition yet maintaining you now monopolistic competitive behavior. So, trade is predict to decrease average cost we have already discussed industry described by the monopolistic competition and explained by this equation. And this gives variety of goods to the consumer, the consumer can buy you know different you know quantities with different qualities as well, it increases the welfare of the consumers.

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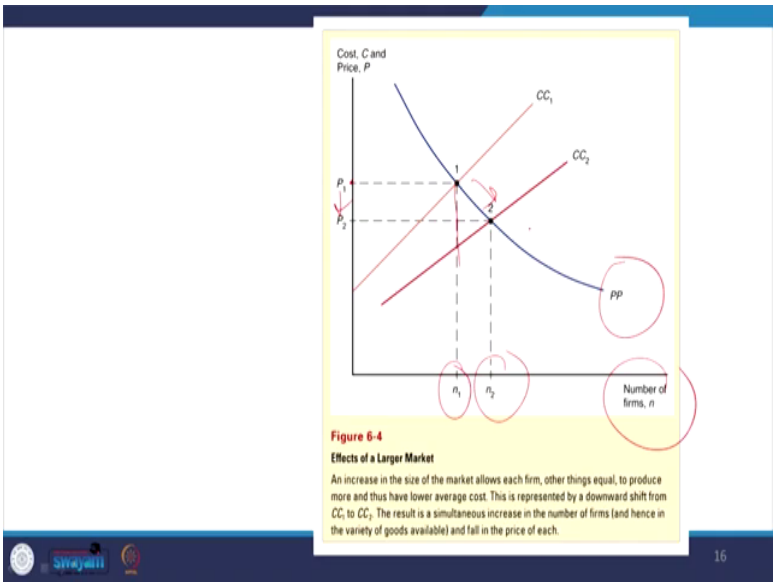

So, this is largely expected explained here. Now, this is number of firms. When number of firms is at n 1 you know price transient P 1. When the number of firms you know increases, the total average cost of production decreases because the total quantity in the industry is expected to be higher, and due to trade also a number of firms and the competitive behavior increases to price falls.

So, the equilibrium points shifted towards right, and given the demand pattern we have already assumed that they have identical demand. So, due to another action of competition in another country the you know number of n 2 is added now so which is actually result in fall in the prices, this can be explained in a simple demand and supply framework.

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Now, let us have we have already explained now the monopolistic competitive market and its connection with reduction in prices, and making the market more competitive and which has made you know higher consumption choices to the countries concerned. And now we are discussing how it is connected to the new trade theory and to the old trade theory.

So, old trade theory largely talks about two products two industries, so, wool and coconut here. So, we are good at different in things and that is why we trade, so far as old trade theory is our concern. Whereas, in the new trade theory which is largely based on economy of scale which says that things can be cheaper in the scale of operation at large.

So, by comparing big aircraft, luxurious cars, there are so many you know luxurious cars possible, whereas coconut varieties defining very differently because they are naturally defined. So, wool varieties differences are very very less, whereas in luxurious car, aircraft you know

there are huge differences in the qualities of the cars also. So, we are similar in abilities, each of us speaks a good requiring large scale production. So, this is what the clear-cut comparison between two set of theories.

Now, based on this; based on this let us you know explain you know the two kind of theories in terms of inter-industry versus intra-industry trade. Though, our next lecture is actually targeted or meant for explaining and the clarity on the differences further between intra and inter-industry trade, we have just seen that the classical or the old theories are based on inter-industry arguments. So, they did not differentiate consumer behavior, they did not of also attached you know economy of scale of production.

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Now, inter-industry trade it is for the earlier theories. So, countries export goods of one product category and imports of goods of another completely variety another product

category as in the Ricardian and also in the Heckscher-Ohlin model. So, the basis of trade was you know comparative advantage due to difference in productivity in Ricardian model, and the factor you know endowments or the factor availability or the resources ability within the country explain the Heckscher-Ohlin or HO model.

So, far is the new trade theories are concerned is specifically emphasized in the writings of Krugman professor Krugman in 1969, which says that you know countries are actually different by their structure in terms of production function, and countries export and import products of the same variety same products category, so explained as explained in the Krugman model. This is the basis of trade here is internal economy of scale.

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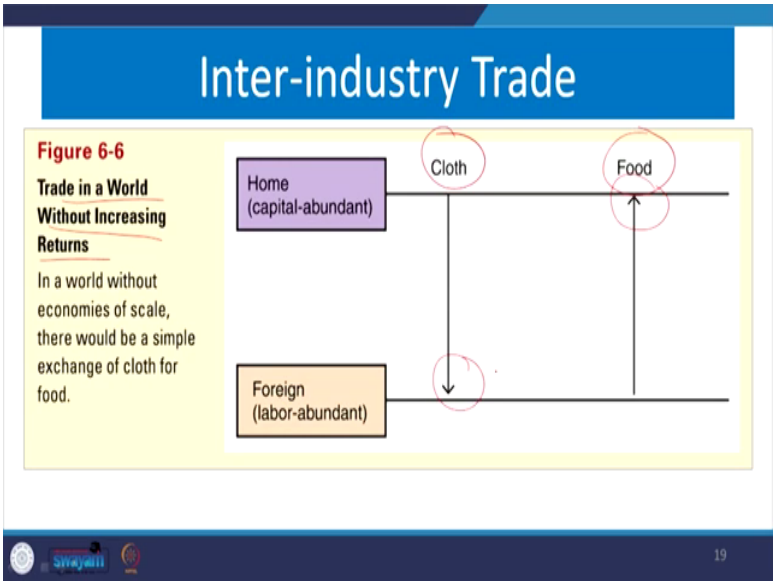

Again there are two types of economies we should discuss it. We will also carry forward this one in the next class, but still let us have been you know understanding of this inter-industry

trade in a diagram. So, largely the trade in a world without increasing returns, I am saying repeatedly that it is it was without increasing returns. So, in a world without increasing returns to scale, there would be a simple exchange of one community exchange with another community let it be cloth and food. So, you can mark the direction here.

So, I mean the home country let us assume capital abundant one and the foreign countries capital labor abundant one. The foreign countries labor abundant, whereas the home countries capital abundant. So, based on this one country exports completely of that range to the labor abundant country and in return getting food which is of from the foreign countries with labor intensive techniques.

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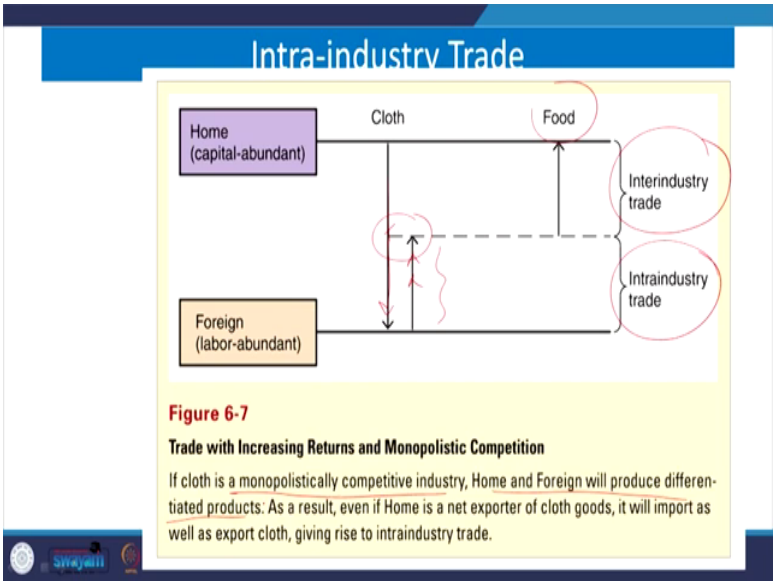

Where is in the intra-industry setups the structure we I explained from the beginning of my lecture that it is actually half the way field of. Now, this extent look at home country capital

abundant and foreign country again with labor abundancy. So, direction is now mixed. Here half the way, here this portion is actually mixed export as well as import. So, this portion is call intra-industry trade, whereas, only exporting and in return getting another variety in terms food is called inter-industry trade.

Now, this is possible because of increasing returns specially in the cloth sector. And if monopoly if cloth is a monopolistically competitive industry foreign in home and foreign will produce differentiated products, its result even if home is a net exporter of clothing or clothes cloth goods it will also import as well as export cloth which is giving rising which gives you know rise to the extent of intra-industry trade ok. I hope it is clearly understood then what are the characteristics of intra-industry trade?

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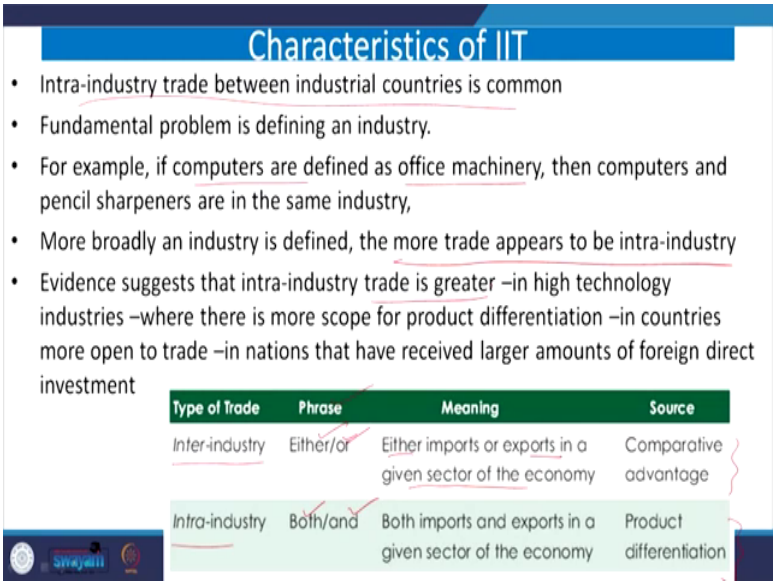

This can further we explained in this box or in the table inter-industry versus intra-industry trade. The phrase are either or, or either these good or that good, these are the terms used, whereas, intra-industry trade both is the word used or and is the word used in the discussion. So, either exports which I said either exports or imports in a given sector of the economy, usually it is of monotonically defined one directional only, so both imports and exports in a given sector of the economy.

What is the source this is I mean base is comparative advantage this is due to product differentiation. So, what are the characters largely, characteristics are largely a of intra-industry trade between industrialized countries which is very commonly observed. We will also discuss these thing in the next class.

So, fundamental problem you know is defining in industry due to IIT intra-industry trade. So, for example, computers you know computers are defined as you know office machinery, then computers and you know pencil sharpeners are in the same industry. If computers are defined as office machinery, that means, the industry is what you know the computers are also required for the office and pencils or pencil related pens tops those are also required for the office, therefore, they those are considered as in the same industry.

So, more broadly an industry is defined as the more trade appears to be intra-industry more broadly an industry is defined more trade appears to be I mean if the industry is very broad trade is defined to be more intra-type because you know many products are within the industry. And evidence suggests that you know trade is higher due to intra industry setups, and you know countries are more opened off and restrictions are less due to even foreign direct investment this has caused you know higher intra-industry trade.

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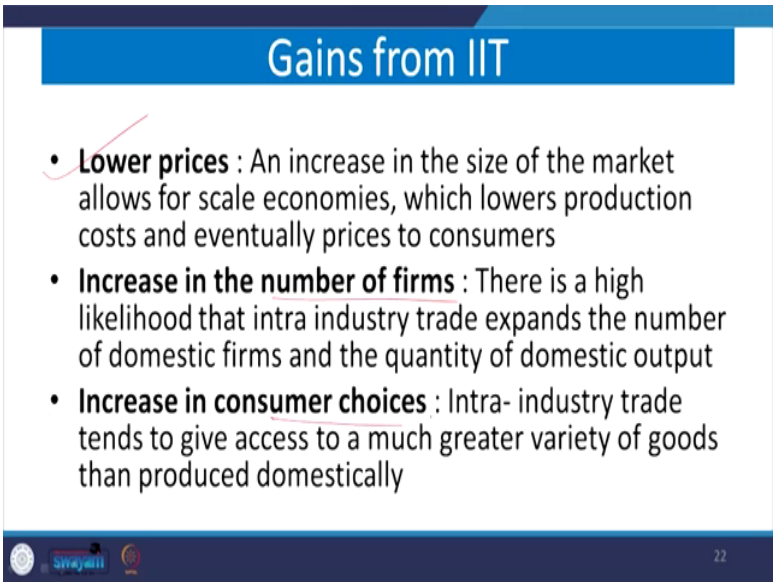

So, there are largely you know various gains it is observed their prices reduces, number of firms increases, competition becomes you know more fairer, so consumer choices and welfare increases due to trade.

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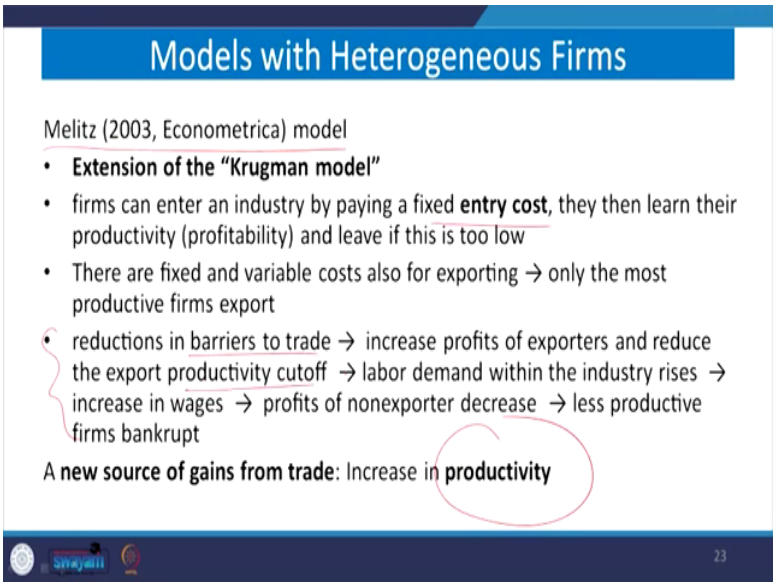

So, we have already discussed, but still you know one another extension should be discussed mainly is discuss as an extension to the Krugman model. This is it bit you know and you know they, they I mean bit advanced then that of Krugman that talked about entry cost and they also emphasize productivity in their in their module. So, where they also discuss barriers in productivity cut offs in their trade module. So, these are all the content in this particular class.

So, you might be expecting a question what are the features of monopolistic competitive market and how it helps in minimizing average cost, and how it how trade is responsible or trade is actually emerged due to monopolistically competitive market. I hope it is understood with this let me you know expect you to be there in the next class to clarify further details of intra-industry trade.

Thank you so much.