Microeconomics: Theory & Applications.
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Lecture – 39
Long-run Equilibrium of a Competitive Firm (Part-2)

Hello, welcome back to the lecture series on Microeconomics. We have seen that at market price P bar, there is a difference between the short run average cost and the long run average cost because of the suboptimal plant size that the firm has chosen in the short run, let us have a look at that.

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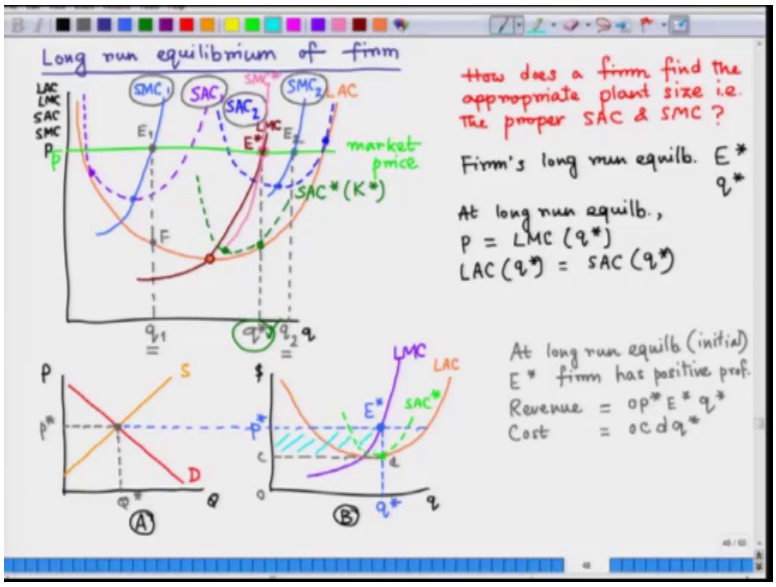

So, one can see that this output level q 1, which is produced by the firm in the short run can be produced in a cost minimal manner, if the firm produces at this point right. So, let me denote this point by F right, why? Because you see that to produce q 1 level of output in the short run the firm is actually spending a high unit cost, the firm is facing a high unit cost, which is given by this length of bracketed line right, that is basically precisely, the difference between the short run average cost one short run average cost and the long run average cost for this particular output level and the chosen plant size right.

So here, we can see that the firm has a plant size, which is probably less than the optimal plant size and if the firm expands it is scale, then that will be beneficial for the firm because, it will bring down the average cost of production. So, now, let us try our

analysis with a larger plant size. So now, let us focus on this alternative plant size, which is giving rise to short run average cost is SAC 2 curve and short run marginal cost SMC 2 curve right

So here, you are talking about a larger plant size, what will happen if we choose this one or the firm starts the production in short run with these, large plant size? So, again here, the equilibrium will be firm short run equilibrium will be obtained at point E 2 say because, that is where P equal to SMC first order condition is met. So again, we look at the equilibrium output level of the firm in short run, just drop a perpendicular line on the output axis and let me say that, this is q 2 level of output. Note that, these positions also; the position may be optimal one in the short run, but it is suboptimal in the long run, why? Because these q 2 level of output is not being produced in the least cost manner look at these difference between these 2 points that, I am marking right; now with this bracket.

So, this is the gap between the short run average cost and the long run average cost. So, per unit cost of production is higher with this plant size as well. So, then the firm is basically working with a plant size which is not required. So, a lesser plant size will probably bring down the unit cost of production. So, we see here that 2 larger plant size also does not help and in this case firm would like to reduce, it is plant size in the long run in near future right.

So, how do we get the appropriate SSE and SMC curves for a given price? That is the question that we have to now answer. So, let me write down this question because, this is a very critical question, how does a firm find the appropriate plant size, it implies the proper SAC and SMC curves right. So, definitely we can see from the diagram that given the price P bar SAC SMC or SAC 1 SMC 1 SAC 2 SMC 2 are not the appropriate curves right. So now, let me superimpose the long run marginal cost curve in this case.

So, we get a long run marginal cost curve, which passes through the minimum point of the long run average cost curve right ok. So now, we know that in the long run firm finds it is equilibrium, when it equates the given market price to the long run marginal cost curve right ok.

So now, this is basically my long run equilibrium, let me denote this by point E star right. Now let me drop a perpendicular from this point on the output axis to get my long run

equilibrium output level and I denote this by q star right. Now see, that I have to find out and a plant size, which is appropriate in this case, what do I mean by that? I mean that this the plant size that, I will choose that will give rise to a short run average cost curve and a short run marginal cost curve in such a way that, in this case the intersection point E star will be also an intersection point between the market price line and the short run marginal cost curve right.

So, basically I have to think about a short run marginal cost curve, which cuts this long run marginal cost curve something like this it hand, drawn diagrams are very difficult to be accurate, but when I am trying my best here. So, it is a very complicated diagram as you can see. So, as this is the optimal plant size in the short run, I am denoting this point by aesthetics.

So, SMC star is basically the appropriate marginal cost curve corresponding to the appropriate plant size. So, of course, this short run marginal cost curve will pass through the minimum point of a short run average cost curve right. So here, we have seen that the firm finds the long run equilibrium position at the intersection between the long run marginal cost and the market price. But what we will how the firm will derive the optimal plant size? And for that optimal plant size, what will be the relationship between the short run average cost curve and the long run average cost curve. For that let us revisit the diagram.

So now, note that as this is the optimal situation of the firm, the firm will find a short run average cost curve such that, it makes tangency with this long run average cost curve at the intersection point like this. So basically, the short run average cost for the output level, which is the long run equilibrium level q star will be same with the long run average cost to produce that particular output level because, this is the equilibrium. So, now, let us try to draw the short run corresponding short run average cost curve.

So, we know that the short run marginal cost curve SMC star will pass to the minimum point of the short run average cost curve that is a theoretical result. So, I can draw something like this, it may not be a very good diagram, but approximately this is right. So, this is the minimum point of the SAC curve corresponding to the optimal plant size K star the SMC star passes through this point and this is the optimal SAC star, which

corresponds to the optimal plant size. So, let us summarize firm's long run equilibrium is the point E star right.

So, long run equilibrium output level is q star and at long run equilibrium at long run equilibrium, we have market price P equal to the long run marginal cost evaluated at this optimal output level q star and long run average cost for that output level is equal to the short run average cost evaluated at that output level ok, but does it mean that the story is over? The answer is no because, here at the long run equilibrium, the firm is earning positive profit and that is known as supernormal profit in economics, that has a that has an implication in the competitive industry market. So now, let us going to study, what may happen, if the firms are not supernormal profit in the long run? Again, we will take the aid of a diagram.

So, we will draw 2 panels here. So, panel A we will talk about the competitive market and panel B, we will talk about individual firm right. So, basically here, we have this industry level output, market output level, this is market price of the commodity and here, we have the cost figures and the prices represented in monitory terms dollar or rupee, whatever and this is basically my individual firms output level right. So now, let us start with the basic demand supply diagram that we had earlier.

So, I have demand function each competitive firm faces that demand function ok. Now let us have the supply function note that, I am drawing the supply function with a positive intercept along the price axis because, I assume that there is a shutdown point. So, there is some minimum price required for the firm to produce and supply to the market supply function is denoted by supply curve S.

So, we know that at the intersection we can determine the equilibrium price and the quantity in the market we have seen these things before equilibrium point. So, I get some P value and q value right. So, let me denote these things by star because, these are like market equilibrium points P star q start good. Now, I am going to draw the individual firms cost curves to see, how the firm will behave in short run and in long run right. So, first I draw this long run average cost curve and then I am going to pass the long run marginal cost curve through the minimum point ok. So now, I am going to superimpose this market price that I have obtained from the competitive market on the same diagram right. So, in the perfectly competitive world our firm is a price taker right. So, the firm

will take this price P star and it will equate the price with a long run marginal cost curve right.

So, this is the equilibrium point in the long run for the firm correspondingly, the firm will produce some output level q star right and of course, corresponding to this equilibrium point say E star there is an optimal plant size K star right and corresponding to that plant size, there will be the optimal short turn average cost curve right and we know that how to get that thing done, how to superimpose that short run average cost curve.

So, it will be something like this at this optimum level, there will be a tangency point and this is basically my SAC star right in the short run, now note that at this point E star the firm is making money right and this is the long run situation. So, let me quickly indicate the profit levels and all ok. So, if I refer to these point, say small d here and if I denote this point as say c let me call this origin o.

So, then in that case at long run equilibrium, I call this initial because, this is going to change we will see how? At long run equilibrium E star firms has positive profit, positive profit is known as supernormal profit in economics. So, what do we mean by supernormal profit? To understand supernormal profit concept, we have to introduce another new concept called normal profit.

So, normal profit is basically the opportunity cost of the entrepreneur, who is running the business, who is managing the firm right. So, earlier we have seen that the firm purchases different inputs like labor, capital, land, raw materials, etcetera to produce the output, but there is an entrepreneur who is basically, managing all the activities right and if the entrepreneur does not does not pay him or her salary then there is no direct cost component in the accounting cost, but we have already seen the concept of opportunity cost, which takes care of this problem of the theory of opportunity cost says that an economist must consider the cost, the cost of the entrepreneurial input in the profit equation or in the cost equation right.

So, we add this opportunity cost of the entrepreneur in the accounting cost equation or in the in the cost equation right, what is the opportunity cost of an entrepreneur? This is the maximum amount of money, which he or she could have earned, if he or she had worked in another industry without giving time to his or her own business right.

So that is basically, the normal remuneration or return that an entrepreneur should expect from the business. So, when a firm earns some profit, which is a going to take care of not only the fixed cost and the variable cost, but also this opportunity cost of the entrepreneur, then we call that as a normal profit. So, basically what happens if a firm observes some price, which is higher than the minimum long run average cost then the firm actually gets much higher than that, what is required to compensate the entrepreneur opportunity cost hence, we call a positive profit a supernormal profit ok, because normal profit takes care of the opportunity cost of the entrepreneur. So now, let us look at what will happen if the firm earns a supernormal profit?

So, how to show that what is the revenue? The revenue is basically OP star E star q star right that area and what is the cost, the total cost of production? That is o c d and q star area right. So, there is a difference this shaded area is the difference right and that is basically, the profit if a representative competitive firm earns positive profit then that will attract many other firms to enter the market because, if they have access to the same technology, they can also produce the same output and sell to the market and earn some profit right. So, there will be the entry there will be the entry of many new firms in the industry and that will have basically, 2 impacts on the profit of the existing representative competitive firm. Let us look at what is going to happen, if new firms enter in the market. We will continue with this discussion in the next lecture.