Economics of Health and HealthCare
Prof. Deep Mukherjee
Department of Economic Sciences
Indian Institute of Technology- Kanpur
Prof. Angan Sengupta
Department of Management, Amirtha Vishwa Vidyapeetham, Bangalore

Lecture -16
Break-Even Point and long Run Cost Curve

Hello everyone, so we are continuing our discussion on cost, so now will discuss a very important component of cost analysis is breakeven point or break even analysis.

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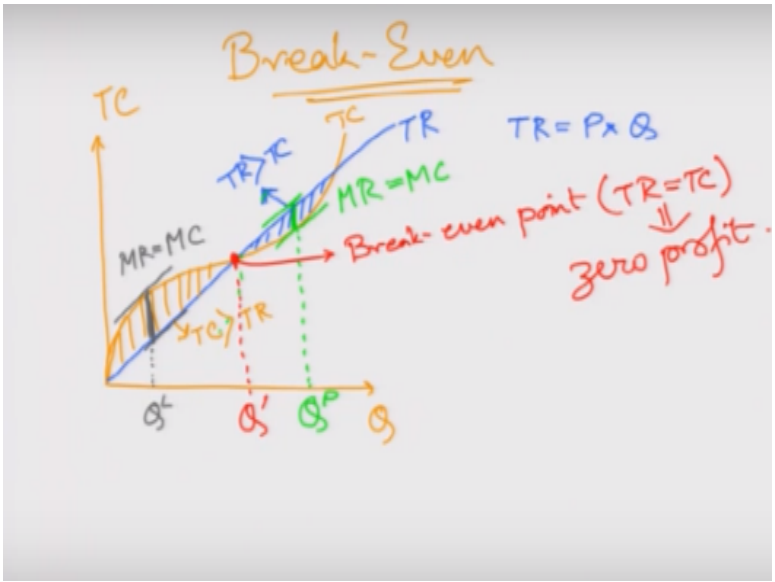

So, while we are you know discussing or talking about breakeven, it basically talks about the relationship between total revenue and total cost. So, if I plot total revenue and total cost, if you remember how this total cost looks like its a sigmoid curve something like this you know something like this and my total revenue curve if I consider it to be as straight line, if I considered it to be a straight line.

Then my total revenue curve is this and total cost curve is this and over here I have my quantity of production and over here the y axis my total cost. What we basically see that total revenue is the product of price and quantity. Total revenue is a product of price and quantity and then if price is remaining fixed with the rising quantity being produced, it is going to be a straight line to the origin.

Now this total revenue and total cost is you know curvatures that when it increases, and it flattens and then again it increases at an increasing rate. When previously, initially it increases at a decreasing rate, so we can say that when total revenue curve is above the total cost curve at this position. When total revenue curve is above the total cost curve we have a positive profit because at this total revenue is > total cost and therefore I have a positive profit.

On the other hand, when I am here we can see that total cost is more than the total revenue. So, total cost is > total revenue. That means I have a negative profit that means I am incurring loss therefore and at this point, which is basically the break-even point on this point I have, this is my breakeven point where I have my total revenue = the total cost. Total revenue=the total cost, which shows that I am having a zero profit condition at this particular output level.

I have achieved this is my Q say prime I have achieved my break-even point where my total revenue is total cost. So, when I am initial starting my production my total cost is increasing. I do not get my total production if you remember is something like this, right? Just opposite to the total cost is something like this. Yeah, so it is like first it is increasing at a decreasing rate increases at an increasing rate and then again it decreases and increases at a decreasing rate.

So, if I yeah so if I have this total this total product curve which is at the very beginning not producing much you know the returns is poor then my cost is higher and as my return is poor my revenue is also not very high and then I am making a loss. So, my total cost at the initial stages of my production my total cost is < my total revenue and > my total revenue. And I am making a loss.

And slowly with the rise in production the total cost comes down total production increases at an increasing rate. I moved at a point where my total revenue meets the total cost that is my breakeven point and I move further total cost is lower than the total revenue, giving me a positive profit. The vertical distance at the point where my vertical distance between total revenue and total cost is highest at that output level my profit is highest Q star.

My I make the highest profit, or I can write it a QP QP my profit is highest. Eventually when my total revenue and the vertical distance between my total revenue and total cost is maximum at that point where total cost is higher than the total revenue I am making the maximum loss. In both these two points the slope between these marginal revenue and marginal costs are equal. Similarly, over here the slope between marginal revenue and marginal costs are equal.

So, on both these points here marginal revenue=marginal cost and I get maximum loss because my total cost is higher than my total revenue. And on this marginal revenue=marginal cost but I get maximum profit because my total revenue is higher than the total cost at this period of at this you know this blue shaded region. And over there only at that point I have highest profit after that, again my profit reduces increasing my cost.

At that point I have the highest profit where the vertical distance between revenue and cost is highest and the slopes of the revenue curve and that the cost curve is basically similar. So, this is how we can identify at which point my profit will be maximized. At what level of output and at what level of output I reach the break-even point after continuously incurring losses in the beginning of my production.

But I will never go beyond this that is primarily because again if I continue overproduction I am going to the diseconomies of scale. We learn about that or a diminishing returns to scale where my cost will increase at a rate which will be unassailable because with this output production, you know the I am not making an efficient choice. Now I will move to till now I was talking about the short run curve.

What about when I talk about long run total cost curve.

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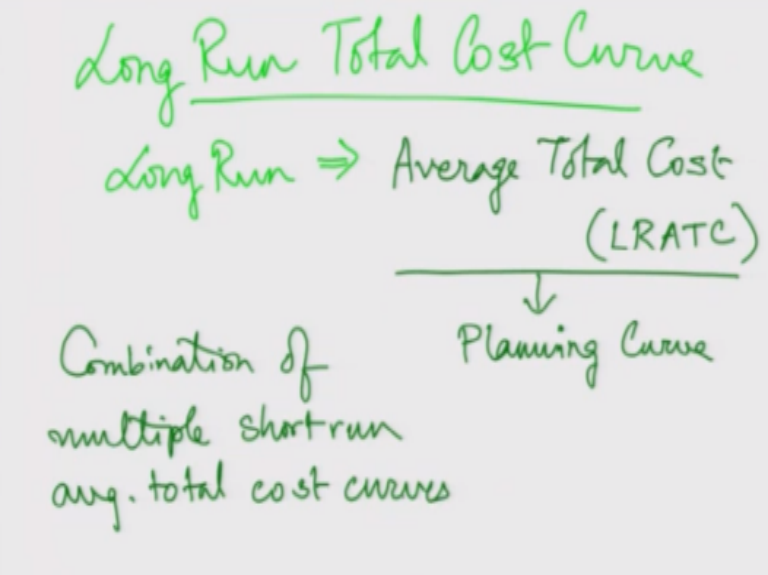

Long run total cost curve or it is actually in long run production function when we decide about the way in long run production function when we talk about the cost mechanism we primarily look at the average total cost. We primarily look at the average total cost at long run you can call it a long run average total cost LRATC long run average total cost. This long run average total cost is also known as a planning curve.

Because in long run I can change all my variable inputs, or I can change all my inputs to all my input turns variable and I can really this change my you know the skills of production over the period of time deciding about the amount of production I am going to make. Therefore I am planning for a longer duration or for you know for my future. Yes, so that is how we are and that is when we are deciding the cost mechanism given the long run cost mechanisms.

And based on this long run average total cost I can identify that at which level I have this long run average total cost and how much. A long run average total cost shows the per unit cost for production at a longer period of time where all my variables all my inputs are variables and based on my plant size that is where plant size means my capital and labor inputs. The amount of capital and labor and the desired outcome.

A long run average total cost is basically a combination of several short run average total cost curves, a combination of several average total cost curves, combination of multiple, short run average total cost curves. Yes, how do I combine them? Let us see.

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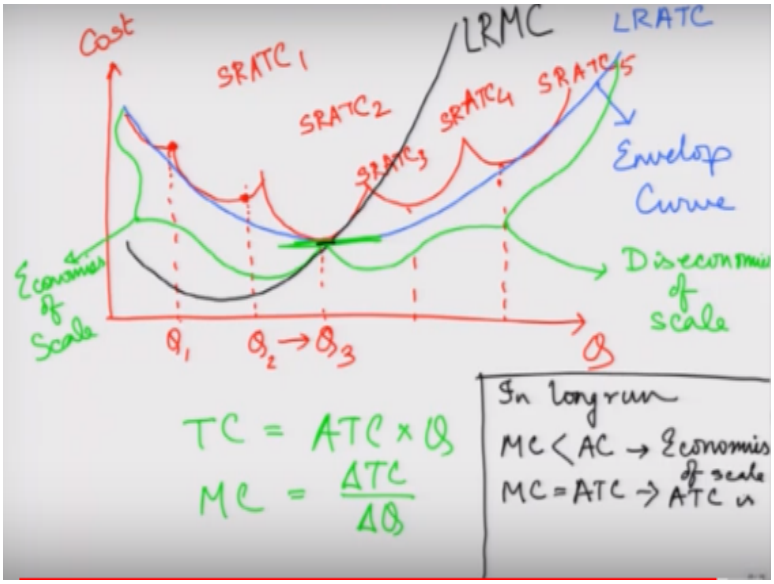

So, the long run cost the long run actually it is a combination of several short run periods. So, when I start producing the production I basically look at okay for a smaller duration of time. However I am going to work you know for a smaller particular time period. So, when I am talking about this you know short run average total cost curve. At the very beginning of my production unit I have this SRATC1 short run average total cost curve 1.

I have another search run average total cost curve 2 I have another short run average total cost curve 3. And then I have another one over here 4 and I have another one 5. Yes, now I have this short run average total cost I am producing this much as the short run average total cost because this is my best production at this short run average total cost 3. This is my best production and so on.

Having said this having said this this is my quantity of output. If I am here at this short run 1 then I will manufacturer only this much. When I moved to short run 2 I eventually realized with higher production I can move to short run average say if my curve is something like this is

SRATC1 then I can if I am continuing on SRATC1 short run average total cost 1 then I am actually incurring a higher cost.

So, I will move to a new unit where I am to SRATC2 and I can find that with this quantity Q2 I am incurring a lower cost and so on. With Q moving from Q2 Q3 with further production, I can move to SRATC3 where my cost is further low. So, in a long run in a long run I will find this several points where for each input or for each output I have different factors of production. So, it will be something like this.

And then so this can be my long run taking into account all these individual short run curves. A production function can have you know virtually unlimited shorter number of possible plant sizes in short runs you know so unlimited. And if I have unlimited possible plant sizes then I can have a smooth long run average total cost curve. So, this is my long run average total cost curve which is a smooth one.

Yes and this curve is also known as envelop curve because it actually you know you can see that it covers all these short run cost curves you know. So, it can, it kinds kind of forms an envelopes so it knows it is known as envelop curve and it is a basically a smooth one. Now in the downward sloping region of long run average cost curve shows that I am having an economies of scale.

In an increasing part where the cost curve goes upward sloping then I have a dis economies of scale economies of scale and diseconomies of scale. Now this economies of scale can happen because of the labor specialization because here my cost is decreasing with further output you know. So, it can be because of labor specialization if we are thinking of labor it can be because of technical you know specialization with better technologies and all.

So, my capital is being improved so my cost is decreasing. And another way if we are thinking of the managerial terms it can be because of managerial specialization. Because of managerial specialization based human resource management based scheduling and so on and so forth. Best

operation research techniques given the same capital and labor my cost is coming down you know.

But when we are on the upward sloping curve then there can be several reasons you know which are managerial apart from you know the kind of diminishing returns to scale. Or apart from the of the inputs that were my inputs are not really doing the best the decreasing returns to scale is decreasing and diminishing. But at the same time in terms of managerial if there is a lot of hierarchy if the you know the management decision is not the best.

The labor is not actually connected with the organization then basically you know the output per labor the average output per labor falls which eventually increases the average cost. So, this is the dis economies of scale which we can think of in terms of the managerial point of view. At the same time at this point we can you know sometimes see a longer stretch of this where the average total cost is flat.

That means for a particular duration or for a particular point it is having a constant economies of scale or you know the constant returns to scale where the you know the with the change in labor and capital the output has remained same. Though so it does not really have an implication on the change in cost. So, the cost remains fixed you know so we can have a flatter region where it shows the constant returns to scale.

So, therefore we can finally get my total cost multiplied by I can get my total cost for the long run which is nothing but the average total cost*the quantity. And then the marginal cost is nothing but the change in total cost/change in quantity in a longer period of time. When we see that similar to my short run average costs further curves even in the long run we see my this is my long run marginal cost curve.

Which intersects the long run average total cost curve at its minimum point. You know where the cost is minimum so what we find that when in the long run when in long run my marginal cost is <my average cost. My marginal cost is <my average cost then there is economies of scale there is

economies of scale that means that my cost is decreasing. And eventually when MC=average total cost that shows us that my average total cost is at its minimum.

And when marginal cost is > average total cost I see that I am having a dis economies of scale. That means my average total cost curve is increasing therefore this is where we can understand that how in the long run my average cost curve and the my marginal cost curve you know will function together. Thank you.