An Introduction to Microeconomics
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Lecture - 100
Shape of Cost Curves

Now, we can talk about shape of cost curves.

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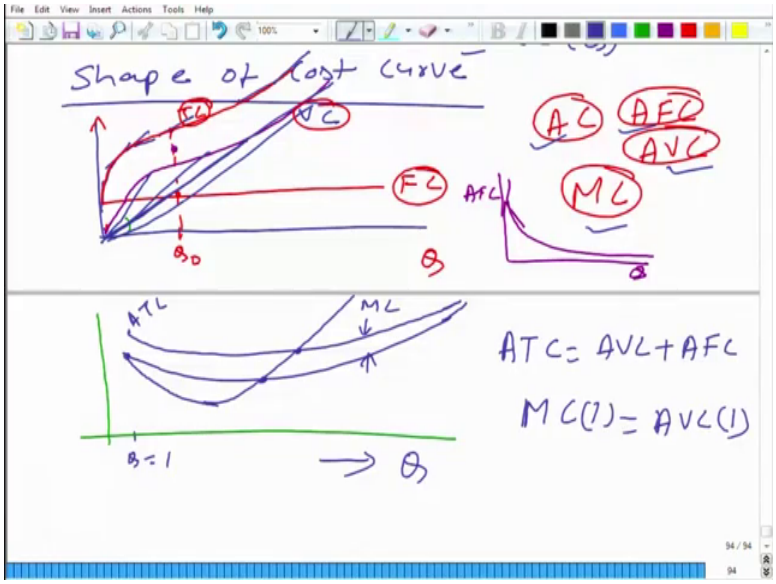

We have earlier talked about just you know here let us take something like this is the variable cost and here we have is something called fixed cost. So, a parallel shift in this we will get it is not very good, but this is the total cost curve.

What we have learned so far is average cost average fixed cost, average variable cost and marginal cost. So, just count the number of different costs we have learned cost concept 1 2 total cost variable cost fixed cost average cost average fixed cost average variable cost and then marginal cost total 7 concepts, we have learnt fine and on this graph here we have quantity.

Student: Yes sir.

Now let us look at all these concepts all these 4 concepts on this particular graph, if I draw a line from origin to let us say at the we take Q naught label and we find a

corresponding point on the fixed cost variable cost and total cost the corresponding point on fixed cost is this on variable cost is this and on total cost is this. We have already learned how can we indicate the average point here, we just have to draw a line from origin to the corresponding point on the fixed cost and the slope will give us the average fixed cost at Q naught, fine. So, now just look at it what is happening at this point when Q is Q naught is almost 0 the average fixed cost the slope of this line is almost.

Student: 0.

Infinite.

Student: Infinite.

It is almost vertical so and it keeps on decreasing and that is why we get average fixed cost starting from very high value and coming to 0 ok. Now similarly let me erase this oops, now similarly, we can identify average variable cost and average total cost and how can we do that again the same technique we can take, you know for this Q naught we can draw a line from origin to the corresponding point and slope of this line is average variable cost and similarly what we have here is the slope of this line is average cost.

Student: Cost.

So, for this graph roughly speaking how we can draw it what is happening to the average variable cost.

Student: It would decrease.

It is decreasing it is decreasing in the like. So, here it is in the beginning and then it starts after some point it starts increasing ok. So, first it is decreasing and then it starts increasing and similarly for the average.

Student: Variable fix.

Average total cost total cost is also.

Student: Decreasing.

Decreasing and then it starts increasing and one thing you should notice that as you move in this direction what is happening between the gap, as you are increasing the quantity what is happening between the gap of this average total cost curve and average variable cost curve.

Student: Sir, it is decreasing.

So, remember what is average total cost it is average variable cost plus average fixed cost an average fixed cost is decreasing.

Student: Decreasing.

Moving towards 0 as Q is increasing, so as we increase Q the difference between these 2 curve diminishes, fine.

Student: Yes sir.

Now how about we talked about average cost we talked about average fixed cost, how about average variable cost how about the marginal cost, what is the marginal cost in this graph at any point it is the slope.

Student: Slope of tangent.

Slope of the tangent, fine.

Student: Yes sir.

Slope of the tangent ok. So, what is happening earlier the slope is;

Student: It would decrease as we go further.

Earlier, the slope is higher than average variable cost remember, if we take that discrete example if we take the discrete example at Q is equal to 1 marginal cost is equal to average variable cost.

Student: Cost, yes sir.

So, what is happening here it is decreasing or it is increasing?

Student: Sir, it will margining.

Slope is let us look at it; slope here, slope is decreasing.

Student: Yes sir.

So, it is decreasing it is its decreasing from this value and then it starts increasing at this point it starts increasing, so in point it starts increasing fine. Can we find any relation between these 2 points and this marginal cost curve and the average total cost and average variable cost curve?

Student: Where they are intersecting.

Where they are intersecting

Student: Sir, can you shift it a little? It would be Mathematical.

Student: It would be that point when the line fault when the tangent is parallel to that line.

Graphically speaking.

Student: Yes sir.

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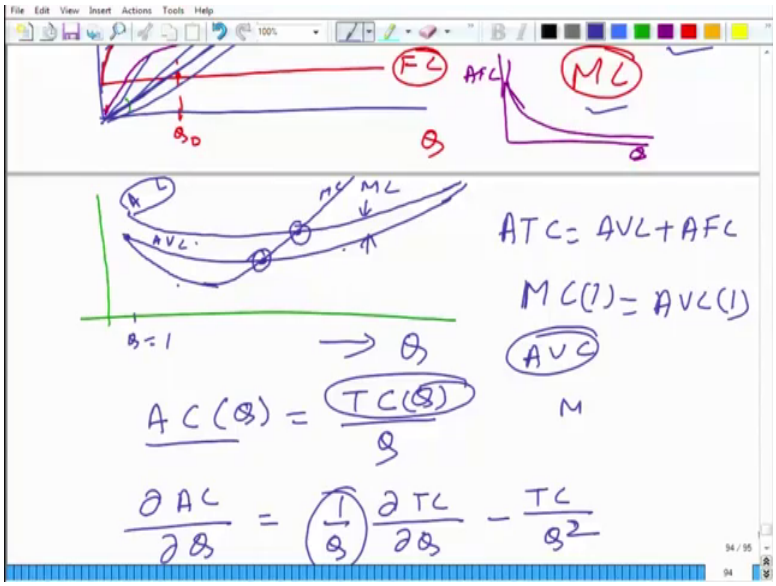

Or let us look at it this is average cost curve this is equal to total cost divided by Q.

Student: Yes sir.

If you differentiate the total average cost with respect to quantity what do we get what do we get?

Student: 1 by Q d TC by d Q.

This is what we obtain first we differentiate with respect to T C and keeping Q at it is. So, 1 my Q and then differentiate differential of T C with respect to Q and then we keep T C in the numerator and we differentiate 1 by Q and this is what we get and so this is if we take 1 by Q common what do we get M C minus A C do not we.

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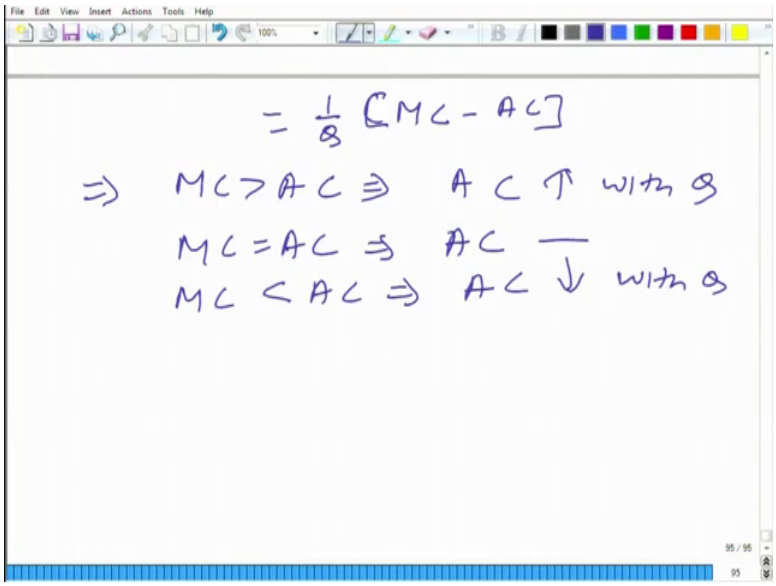

Student: Yes sir.

Fine, so from here what we can get if you look at it if MC is greater than AC.

Student: If M C.

Then AC is increasing with Q because we are differentiating with respect to

Student: Q.

Q and when mc is equal to AC; AC is stationary.

Student: Constant.

And MC is less than AC, what happens AC is decreasing do you remember any such result from the earlier lesson we talked about marginal productivity and we got very similar result. So, now look at it here, here MC is below average variable cost, so average variable cost is or in other let us look at it ATC and MC curve, this is mc and this is ATC MC is lower than average total cost it means average total cost or average cost will decrease and above this point marginal cost is above average cost. So, average cost curve will increase; so at this point average cost.

Student: It would;

Average cost is minimized

Student: Minimized.

Minimized; similarly, rather than using here average cost, you can use you can differentiate average variable cost you will get the same relation. So, here marginal cost is below average cost average variable cost. So, average variable cost is decreasing fine beyond this point marginal cost curve is above average variable cost. So, average variable cost is increasing and at this point average variable cost is minimized and here for minimization mc curve should cut the average variable cost or average cost curve from below that is opposite from what we had learned.

But remember there we were talking about maximizing productivity; here we are talking about minimizing the cost ok. So, when we have minimization the curve should cut from below that is the second order condition, fine.