Managerial Economics
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Lecture - 51
Perfect Competition (Contd…)

We will continue our discussion on the first form of market that is on Perfect Competition. So, if you remember in the last session we are discussing about the this kind this type of market form that is perfect competition and this is one type of extreme as compared to the monopoly. So, in the last class we discussed about the different characteristic features of perfect competition.

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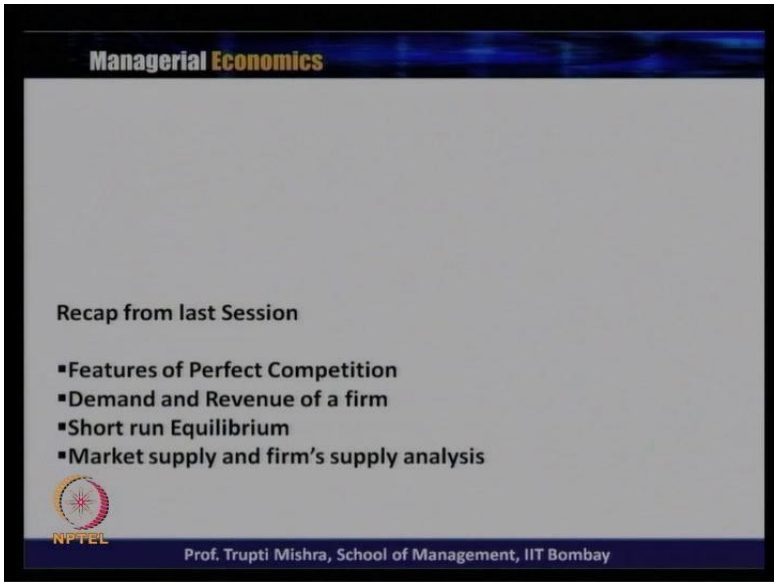

And how it makes as a perfect competitive market structure, then we talked about the demand and revenue of a firm competitive firm and demand and revenue for the industry. Then we talked about the profit maximizing condition that is two condition, one is necessary condition and second one is sufficient condition. Then taking this two profit maximizing condition, we analyzed the short run equilibrium in different situation like a super normal profit, normal profit and super normal loses.

And then we talked about the like, the subnormal profit, what generally the firm gets when they are getting into the shutdown operation, we checked the shutdown condition in which case generally the firm stops the production get out of the market, and when if we look at in a

typical market the manager has to take two decision either whether to produce, and whether to shutdown. So, we checked the in that context we checked the shutdown condition.

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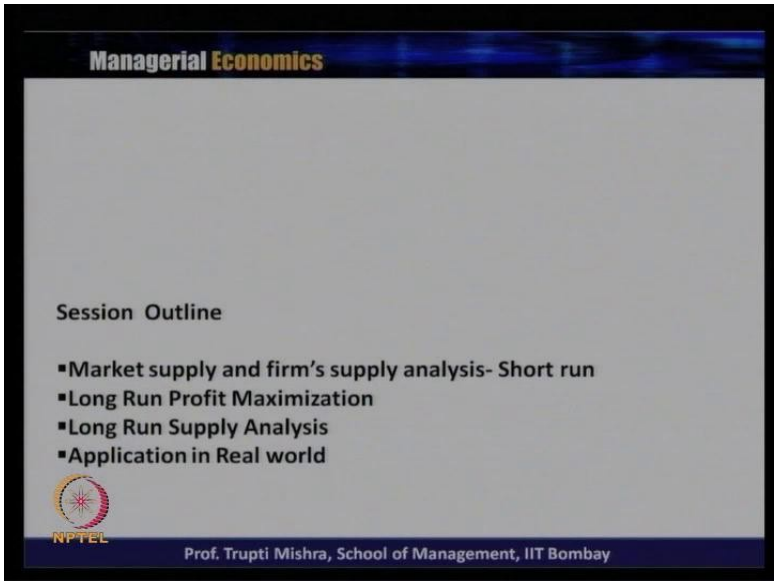

So, in today's session we will start our discussion with a supply, market supply and firm supply analysis in the short run. Then we will discussion the long run profit maximization, then will talk about the long run supply analysis, then we will see how what is the in what is the imposition of tax. Generally what is the effect of imposition of tax in the theory of typically in the perfect competitive market and then we will see whether there is a relevance of this perfect competitive market structure in the real world.

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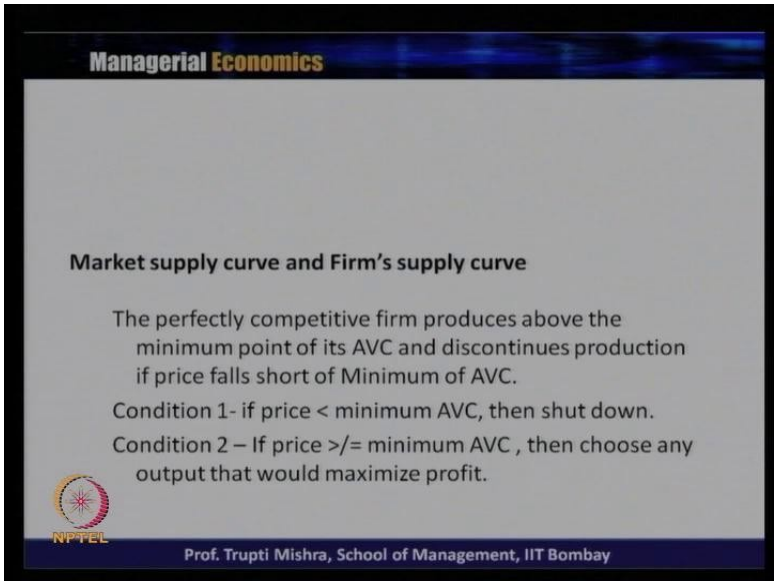

So, to start with the with the short run market supply if you remember we just we just stop our discussion on the in the last session on the shutdown condition. And what is a shutdown condition if the price goes below the minimum of AVC generally the firms shutdown the operation. So, that is the starting point to analyze the short run supply function in case of a perfect competitive market structure. The perfectly competitive firm produces above the minimum point of AVC, because any any level of output below the minimum point of AVC it brings ah there is no profit or no loss. May be it is not loss apart from profit it is not loss even they are not able to cover the variable cost also and discontinues the production if price falls short of minimum of AVC.

So, from this shutdown condition there are two condition immerge, one condition one if price is less than minimum of AVC, then shutdown, condition two if price is greater than or equal to minimum of AVC then choose any output that would maximize the profit. One is the first case is very clear, if it is less than minimum AVC then shutdown, second one if it is greater than or equal to minimum AVC then the firm should go for production.

But, there again the he he has to take a call or the manager has to take a call, that what is the output level that would maximize the profit. And to get that level of output again the firm has to go to the profit maximizing condition taking both the both the first order and second order or the, so called necessary and sufficient condition to profit maximization.

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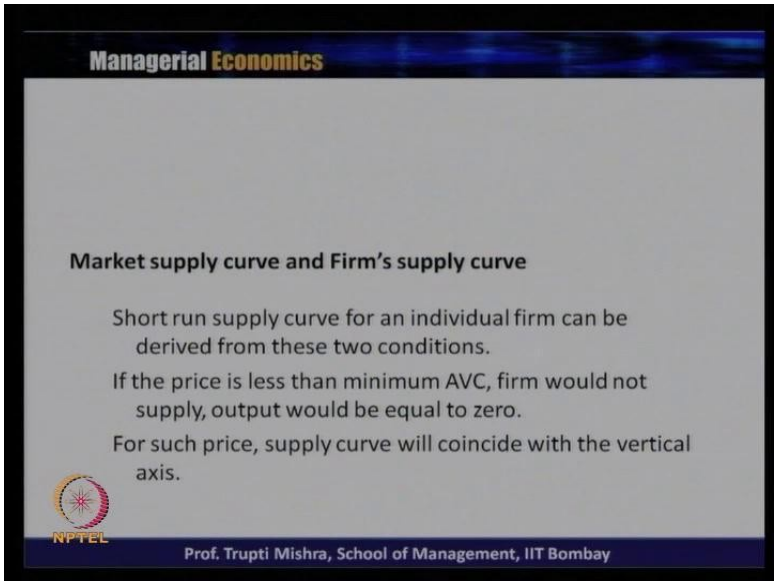

So, short run supply curve for any individual firm can be derived from this two condition; that is condition one shut down, condition two produce the profit maximizing level of output. So, if price is less than minimum of AVC, firm would not supply output would be equal to zero. So, any level of price, which is less than minimum AVC firm would not supply. So, obviously, if it is shutdown, then output would be equal to zero for such price, supply curve will coincide with the vertical axis, because at this price if the output is zero the supply curve will coincide with the vertical axis.

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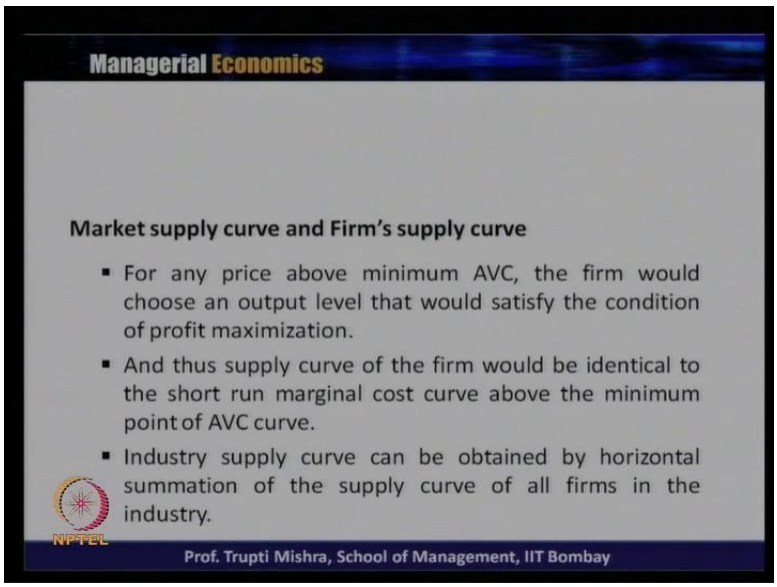

Whereas for any price above minimum of average variable cost the firm would choose an output level that would satisfy the condition of profit maximization. So, supply curve of the firm would be identical with the short run marginal cost curve above the minimum point of average variable cost. And industry supply curve can be obtained by horizontal summation of the supply curve for all the firms in the industry. So, the point here to note that any point in the minimum below the any point any price point below the minimum point of AVC there is a shut down.

So, we can start at a the starting point for the supply, because if the price is at that level then only the output will be produced and the supply will be given to the market. So, that is the starting point and that is why if we look at where AVC is minimum may be AVC is minimum at when its actually the marginal cost curve cuts the AVC at it is minimum point. That is the reason we consider the marginal cost of the marginal cost of the firm in the short run is the supply curve not the entire marginal cost curve, rather the that segment of the marginal cost curve which lies above the minimum point of average variable cost.

That serve as the short run supply curve in the in the perfect competitive market that is for the firm. And if you do a horizontal summation of all supply curve all individual supply curve for all competitive firm, then we reach to the market supply curve.

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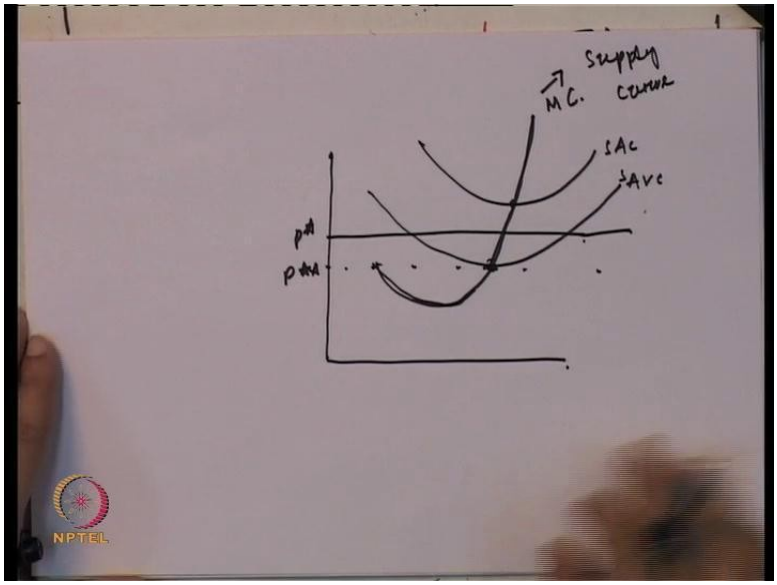

Let us see graphically how we reach to the market supply curve, this is how short run average cost curve this is our average variable cost short run average variable cost and its minimum

point marginal cost curve will intersect. So, this is the corresponding to this, this is $P^{¿}$this is our equilibrium price that is $P^{¿}$. So, now how, to identify this supply curve, so $P^{¿}$is the price that is decided on the basis of the market price, any price if it is goes below this $P^{¿}$.

$P^{¿}$to $P^{¿*¿¿}$ any price if it is goes below that, then the market or the sellers they will not supply in the market. And that is the reason if you look at this is the starting point of the supply curve and the segment marginal curve segment, which is lies above the minimum point of the average variable cost, that becomes the supply curve for the firm.

So, the short run supply curve is the that segment of the marginal cost curve which lies above the minimum point of average variable cost, because if you look at that is the starting point of the supply. If price goes below that generally the generally the supplier they are not supplying the product into the market. Now, we will just take a numerical example to understand in a typically when we take it into the real life case, when we have a cost function given, when we have a demand function given. How to identify what is the shut down condition or how to find out the price below, which the firm generally not supplying any product to the market.

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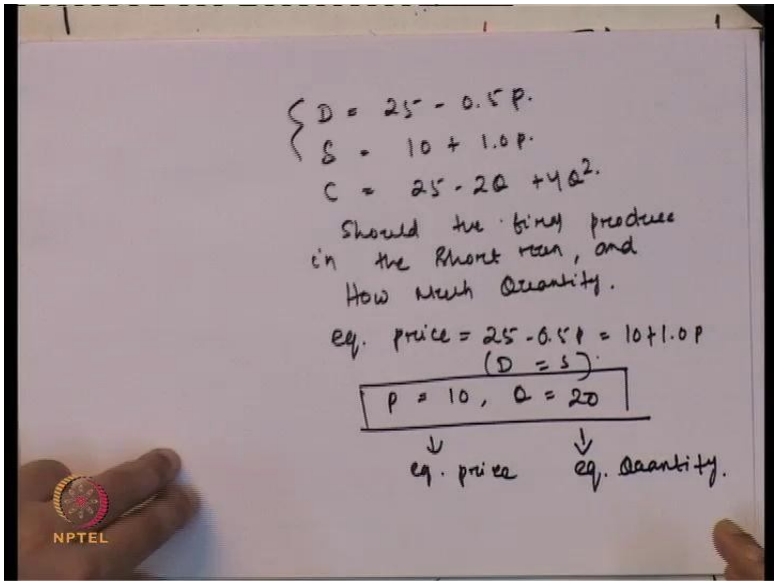

So, we will take the market demand curve that is we will take the market demand curve that is D that is equal to $D=25-0.5P$and we will take the supply that is $S=10+1.0P$. So, if we now and the cost function we will take as $C=25-2Q+4Q^2$; now we need to find out should the firm produce in the short run and if they are producing in the short run, how much quantity they should produce.

Now, from the demand and supply function, we will try to find out what is the equilibrium price or what is the market clearing price, where the seller and buyer they will sell and buy whatever they would like to interested. So, the demand curve is $D=25-0.5P$ and the supply curve is $S=10+1.0P$. So, this is typically the demand is equal to supply, if you solve this then we will get P is equal to 10 and Q is equal to 20.

So, P is equal to 10 is the equilibrium price and Q is equal to 20 is the equilibrium quantity or we can call it market clearing price and market marker quantity market clearing quantity. Now, what is the next task we have to do in order to find out the minimum point, the shut down point we need to find out the profit maximizing level of output. And how to find the profit maximizing level of output that is again through the profit maximizing condition, that is marginal revenue is equal to marginal cost. And the slope of the MC should be greater than the slope of the marginal revenue curve.

So, in the long run if you remember what is the equilibrium condition, the long run before going to the long run long run equilibrium condition is where where the long run average cost curve should be equal to the P, which is equal to MC. Taking the same thing in the short run, because if you look at MC is equal to MR, MR is also equal to P in case of the perfect competitive market structure. So, if it is MR is equal to MC we can also reframe that as a MC is equal to P, because MR and P is equal in case of a perfect competitive market structure.

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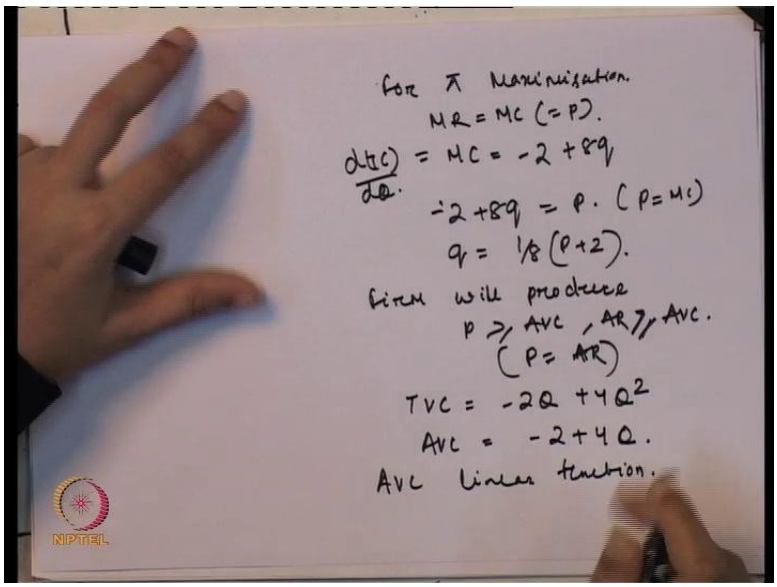

So, for profit maximization for profit maximization we know that marginal revenue is equal to marginal cost and which is also equal to P, so now what is marginal cost? Marginal cost is $MC=-2+8Q$ that is may be how we get this MC we get this M C by taking the derivative of the total cost with respect to Q, so $\frac{d(TC)}{dQ}=MC=-2+8Q$. Now, this $-2+8Q$ has to be equal to be the price as price is equal to marginal cost, now to solve it for Q it will come $Q=\frac{1}{8}(P+2)$.

Now, we know that firm will produce till the time P is greater than equal to average variable cost or we can say average revenue is greater than equal to average variable cost; as in case of perfect competitive marker structure P is equal to average revenue. So, to find that this P is equal to average revenue, this is how we say that if at any point of time. If AR is greater than equal to AVC or P is greater than equal to AVC firm will continue the production.

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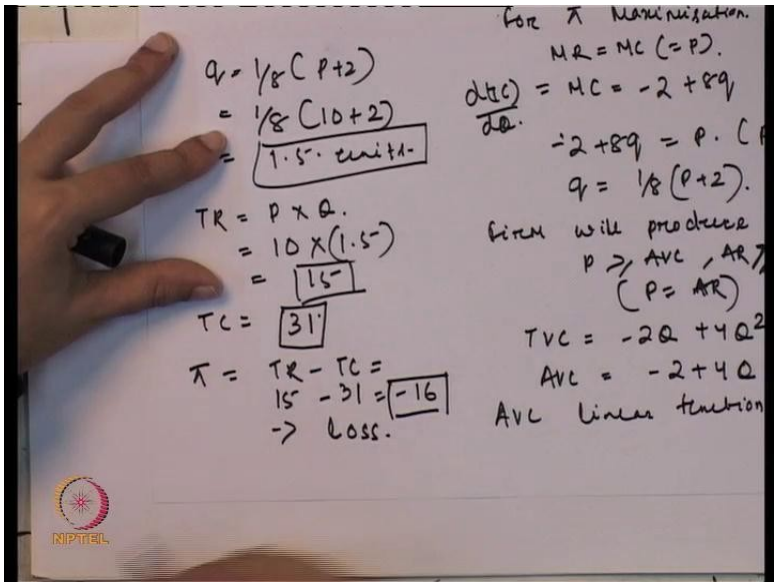

Now, we will find the total variable cost total variable cost is $TVC=-2Q+4Q^2$ and through this we can find out the average variable cost and average variable cost is $AVC=-2+4Q$. So, as we know that AVC is a linear function and as it is a linear function it has no minimum. So, the firm would produce the quantity, which is Q is equal to $Q=\frac{1}{8}(P+2)$. So, that is equal to if

you simplify this again 1/8, p is equal to 10 as we have decided the equilibrium price that is 10 plus 2, so this comes to as a 1.5 units, so q is 1.5 units.

Now, what is total revenue total revenue is $TR = P \times Q$, so P multiplied by is P is equal to 10, q is multiplied by Q is 1.5. So, $TR = 10 \times 1.5 = 15$, so Q is equal to 1.5 total revenue is equal to 15. Similarly what is the total cost, total cost we have to put the value of Q in the total cost and there we get the total cost is equal to 31 $TC = 31$.

Now, what is the profit here, profit should be ideally total revenue minus total cost $\pi = TR - TC$ if it is comes total revenue is 15 and total cost is 31, which is minus 16. So, this cannot be called as profit rather this is loss. So, in this case in this cost function ah if they are operation at a profit maximizing level that is P is equal to MC they are they are not getting the profit rather rather then that they are incurring loss.

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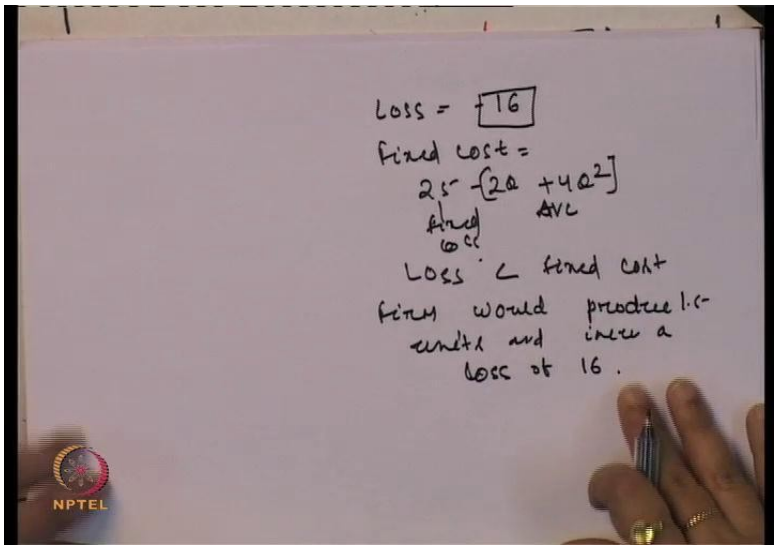

So, now we know that the loss is equal to minus 16 or maybe we can say loss is equal to 16, now what is our fixed cost. So, if you remember you are if you remember your cost function cost function is $25 - [2Q + 4Q^2]$. So, here this part is average variable cost this part is this part is variable cost and this part is fixed cost; so whatever the loss that is less than the fixed cost that is equal to 16.

So, the firm what will the what is the thumb rule or what is the decision for the firm now, firm would produce 1.5 unit and incur a loss of 16. But the natural questions comes here that why they should why the firm should produce when they are getting a loss of 16 rupees.

Because, if you remember the shut down condition, what we discussed till the time they are covering the variable cost they should produce, because it is still profitable for them, that they are not incurring fixed cost by shutting down the operation point one.
Point two is here if you look at the fixed cost is more than the loss. So, if they are incurring it if they are producing at least they are paying less or they are incurring less loss but if they are just shutting down they have to pay 25 rupees which is equal to the fixed cost. And point two is that since this is a short run of situation the possibility is that even if they are incurring loss now, at least if they are continuing the production, if they are continuing the operation.

At least in the when it goes to the long run scenario at least they will incur a normal profit or they will incur a super normal profit. And short run since the time period is short always the producer would like to continue the production even if they are incurring the loss with the aspiration with a hope that they are going to at least get the profit at least in the long run.