Conservation Economics
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Module 9
Industrial organisation and Conservation
Lecture 2
Competition

Namaste! We move forward with our discussion on Industrial Organization and Conservation and in this lecture, we shall have a look at Competition. So, we will begin with a recall. Rational decision making is based on cost benefit analysis which is a study that compares the cost and benefit of providing a good or a service.

What we are saying here is that rational decision making, which is the basic assumption that we make in the case of theoretical economics, it says that the rational decision making is based on a cost benefit analysis; what is the cost of doing something and what is the benefit that we are going to receive by doing that activity.

This brings us to the concept of profit and profit is defined as total revenue minus total cost. For a firm the profit is the benefit. When the firm is making a decision which is a rational decision, then it bases its decision on the amount of profit that it is going to receive.

We also had a look at a competitive market. Competitive market is a market in which there are many buyers and many sellers so that each has a negligible impact on the market price. Essentially what happens in the case of a competitive market is that there are so many buyers.

And so many sellers that any one buyer or a group of buyers or any one seller or a small group of sellers is not able to make a big change in the market prices. Which means that, these people are price takers, that is the buyer will have to take the price that is being offered in the market and the seller will have to sell at the price that is being offered by the market.

We also had to look at the characteristics of perfectly competitive markets 1 - goods offered for sale are exactly the same. 2 - there are so many buyers and sellers that no single buyer or seller has any influence over the market price; all buyers and sellers are price takers.

This is a very important statement that you should remember that in a competitive market all the buyers and sellers are price takers. At the market price, the buyers can buy all they want and the sellers can sell all they want and this is because there are so many buyers and sellers that if a buyer is ready to procure the goods at the market price.

Then there are so many sellers that he can buy an indefinite amount of goods and similarly if there is a seller who is ready to sell things at the market price, then there are so many buyers that he can sell as many things as he wants. Then another characteristic is perfect information transfer regarding prices which means that the buyers and the sellers know at all times what the

prevailing market prices are.

Now, this is very important because the buyer is not spending time and energy and effort in finding out at what rate different sellers are selling the things. So, he gets this information in an instant. So, this is an assumption that we make in the case of a competitive market. Similarly, the seller knows at an instant what is the price at which different buyers are ready to buy the goods.

When that happens the biggest thing is that the seller can sell the goods to the buyer who wants to pay or who is ready to pay the maximum amount. And, because this thing can happen in an instant so, if there is any buyer who wishes to buy at a price that is greater than the market price, then so many sellers will be ready to supply him the goods that it will bring his price down.

Which means that, suppose, I go into the market in a fairly competitive market, and I see that there is this pen that is being offered. Now, I am ready to pay as much as 20 rupees for this pen, but the prevailing market price is 15 rupees.

If I say that I want to purchase 20 pens for 20 rupees each. What will happen is that there will be so many sellers who will be ready to supply me these pens at 20 rupees that I will start to think that ok if 20 probably I am offering them a bit too high a price. So, let me offer them 19 rupees because at 20 rupees there are so many sellers.

So, basically I can have say lakhs and lakhs of pens for 20 rupees and remember that the goods that are being offered are the same, that is they have the same quality. So, when I am offering 20 rupees there are a very large number of sellers and I have so many pens that I can purchase.

Similarly, at 19 rupees, a few sellers would go away because their cost of production is greater than 19 rupees. So, in that case those sellers will go away, but still I have a very large number of sellers and then I will bring my cost down to 18 rupees, then 17, then 16, then 15, and even at 15 rupees I am finding that there are so many sellers who are ready to sell me the product.

But, then when I bring it to a value that is less than 50, less than the market price say I say that I am going to pay 14 rupees and 99 paise and that case I will find that there is no seller who is ready to offer me this pen for 14 rupees and 99 paise and why is that so?

Because there are so many different buyers that there will be some buyers who will be ready to pay 15 rupees. So, the seller in that instant will shift away from me and offer the goods to the other buyer. That is, at any price that is less than the market price or the market equilibrium price, there is no seller who is ready to give me the goods.

And, at any price that is equal to or greater than the market price I can have as many goods as I want and so, the equilibrium is reached very fairly quickly because there is a free flow of information in an instant. So, if I offer anything more than 15 rupees there will be so many sellers that I will think because here again I am a rational decision maker.

Every buyer and every seller is said to make the decisions on a rational basis. So, when I am offering 16 rupees and there are so many sellers I will start with this question that ok can I bring my welfare up? Because the consumer surplus is determined by the price that the buyer is going to pay if I am paying a higher price, then my consumer surplus is less.

So, I will try to bring down the price to increase my consumer surplus and so, I will move from 20 rupees to 19, 18, 17, 16 and 15. But, then at any price that is less than 15 rupees I will find no sellers because they will be offering their goods with the other buyers and in that case in a very

quick instant I am able to reach the market price and, similarly in the case of a seller.

Now, if there is a seller who is ready to sell the pen at the market price that is 15 rupees he or she will find n number of buyers. If the seller is ready to sell the product at 14 rupees, then he will have so many buyers that again with the rational thinking the seller would start to think ok can I increase my producer surplus.

And, the producer surplus of the seller would increase when the price goes up. So, at 14 rupees the seller would say that ok there are so many buyers, let me offer them 14 rupees 50 paise. He will still find so many buyers, then he will slowly and steadily bring the price up to 15 rupees and even at 15 rupees there are so many buyers.

But when he increases it from 15 rupees to 15 rupees 1 paise, suddenly there are no buyers because all the buyers are ready to buy the product from the other sellers because remember there are so many buyers and so many sellers. And, so, this criterion of a very fast moment of information ensures that the competitive market works properly.

So, this is again a very important criteria. A perfect information transfer regarding the prices and when we say perfect it is not just accurate, but it is a keep information transfer and a fast information transfer. Then there has to be well defined property rights. Free entry and exit into and from the market.

Because if there are buyers who find that the prices are too high, then they can go out; if there are buyers who are ready to buy at this price, they can enter into the market there is no restriction. Similarly, the sellers who find that their costs are less than the market prices so, they can earn a profit they will enter into the market.

Those sellers whose cost of production is very high will exit from the market. So, in the case of a competitive market because we have a very large number of buyers and sellers and we want to maintain that condition. So, there is also a free entry and exit from the market. Then there is rationality: both buyers and sellers try to maximize their utility and there are zero transaction costs.

And, when we say zero transaction cost it means that as a buyer if I go from one seller to another seller it should not be the situation that one seller is near to me and another seller lives 10 kilometres away. Because in that case the cost of moving from point A to point B will also enter into the computation.

And, so, when we are making the model of a competitive market we say that there are no transaction costs. The buyer and the seller are able to reach each other; make all their negotiations in an instant without paying any amount for it.

So, there are no transaction costs, no cost of moving from one place to another and no cost of getting the information or transmitting the information. This is what a competitive market or a theoretical competitive market on a model of competitive market will look like. So, these are the characteristics.

And, we also saw that competition is beneficial because it permits everyone to specialize in what they have the highest comparative advantage in. And, comparative advantage is the ability to produce a good at a lower opportunity cost than another producer.

Now, when people are doing a specialization and they are producing things in a way that they

have the highest comparative advantage in effect it brings down the prices. So, it increases the efficiency because different people have a comparative advantage in doing different things and through the specialization people do what they have the highest comparative advantage. So, in effect it brings down the prices for everybody.

Second, competition increases efficiency or the property of the society getting the most it can from the scarce resources. Now, this is because people are doing what they have the highest comparative advantage in which means that they are doing everything very efficiently and so, the cost of producing anything is very less.

So, the resources that the society has are able to generate the largest quantity of goods and services. So, which is beneficial to the society and specialization and efficiency reduce prices which also benefits the consumers.

Now, let us talk about how a firm is going to decide how much to produce, at what rate to produce and how to produce. Now, we have seen before that whenever a firm is doing production, they do it through rational decision making looking to maximize their profits.

That is they want to sell at the highest prices and make things at the lowest possible prices maximizing their profits and profit is total revenue minus the total cost of production. Now, total revenue is given as TR or total revenue is equal to P into Q, where P is the price at which the goods are sold and Q is the quantity of goods that are sold.

Essentially if there are say 100 pens that are sold at 20 rupees each, then we will have that 100 pens is Q and 20 rupees is P and the total revenue is given by P into Q which is 20 into 100 is 2000 rupees. So, this is how we find the total revenue. Total revenue is P into Q.

Average revenue is defined as average revenue is total revenue divided by the quantity of goods sold, AR is TR divided by Q. Now, average revenue is more used when we are talking about a situation when goods are sold at different prices.

Basically if we say that out of these 100 pens we had say 90 pens that were sold at 15 rupees and if we say that we have 10 pens that were sold at 20 rupees. In that case total revenue would be 15 into 90 plus 20 into 10. This would be total revenue and average revenue would be given as total revenue divided by the quantity.

In our case what we are saying is that the price is constant. So, in this case when we write the total revenue is P into Q. And, average revenue is total revenue divided by Q, then we will find the total revenue divided by 2 is P into 2 divided by 2 which is P.

So, the average revenue is the price at which the goods are being sold. Now, this is something that is applicable in the case of a competitive market because the price is constant. But, in the case of other markets we will have an average revenue that is different from the price.

Then we also have marginal revenue, the change in the total revenue from an additional unit sold. In this case, the question that is being asked is that the seller is selling 100 pens at 20 rupees each. Now, if the seller in place of selling 100 pens is now selling 101 pens, and suppose, the 101 pens are sold at 21 rupees.

In that case the marginal revenue will be given by difference in the total revenue divided by difference in the quantity. In this case, this. What we are saying here is that the total revenue earlier, let us say that we are writing TR one is 100 into 20 is 2000.

Total revenue 2 is when the seller is selling 100 pens for 20 rupees and 1 pen for 21 rupees. So, the total is 2021 rupees. Now, in this case delta TR will be given by TR 2 minus TR 1 is 2021 minus 2000 is 21 rupees. So, the change in the revenue is 21 rupees and the change in the quantity is 101 pens minus 100 pens which is 1.

In this case the marginal revenue will be given by 21 rupees. Now, this is a theoretical construct, but when we are talking about a perfectly competitive market in that market everybody is a price taker. The seller is a price taker.

The buyer is also a price taker which would mean that the 101 pens will also be sold for 20 rupees and in that case the marginal revenue will also be 20 rupees which is equal to the price. So, marginal revenue is the change in the total revenue from an additional unit sold delta TR divided by delta Q.

In the case of a perfectly competitive firm we will have average revenue is equal to marginal revenue is equal to the price. Because in this case what will happen is that average revenue is total revenue divided by quantity is P into Q divided by Q is equal to P.

And the marginal revenue is delta TR divided by delta Q is equal to TR for selling n plus 1th item minus TR for selling nth item divided by n plus 1 minus n. So, delta TR is the total revenue for selling the larger number of quantities minus total revenue for selling the smaller number of quantities.

And, in this case we are talking about the change in the revenue by selling one extra item. So, earlier the seller had sold n items and now, he is selling n plus 1 items, which is why we are having TR n plus 1 minus TR n.

In this case total revenue for selling n plus 1 items will be P into quantity which is here n plus 1 minus TR for n items is P into n divided by n plus 1 minus n is 1 which in turn becomes. So, this now becomes P n plus P minus P n divided by 1. Now, P n and P n get cancelled is equal to P.

What we are finding is that AR is equal to P and MR is also equal to P. So, in total what we can write is that AR is equal to MR is equal to P. Average revenue is the same as the marginal revenue which is equal to the price at which the goods are being bought and sold.

This is one example. In the first column we have the number of samosas that are being sold and the price of each samosa is 6 rupees. Now, when we have this chart the total revenue given by TR is equal to P into Q.

When Q is one then total revenue is 1 into 6 is 6 ; when 2 samosas are sold then total revenue is 2 into 6 is 12 ; when 3 samosas are sold then it is 3 into 6 is 18 and so on. So, in this column we have the total revenue. The average revenue is given by TR divided by Q.

So, here we have TR divided by Q 6 divided by 1 is 6, 12 divided by 2 is 6, 18 divided by 3 is 6 and so, we are finding that average revenue is equal to 6 rupees in each case which is equal to P. So, P here is 6 rupees and here we are finding that this all is also equal to P.

In the case of marginal revenue it is delta TR divided by delta Q. So, delta TR is the difference between this TR and this TR 12 minus 6 is 6 divided by delta Q is an increase of 1. So, 12 minus 6 is 6 18 minus 12 is 6 24 minus 18 is 6.

And so, here we are also observing that in each of these the MR is equal to the price. So, for a competitive firm that is a price taker the average revenue is equal to the marginal revenue is

equal to the equilibrium price in the market at which the goods are being sold.

Now, the thing is that when a firm is making the goods and is telling the goods the aim of the firm is the maximization of the profit. So, we saw this in the case of the cost benefit analysis. The benefit to the firm is the profit and the firm is trying to maximize the benefit. So, how can the profit maximization be done?

Now, when we talk about profit maximization we need to remember that marginal revenue is fixed which is given by the price. So, here we have observed that the marginal revenue is equal to price, but when more and more quantities of goods are being produced the marginal cost increases.

And, we have observed that the marginal cost increases because of the law of diminishing marginal product which means that for every additional unit of item that is being produced, the inputs do not work that hard. The efficiency goes down.

So, the marginal cost increases when more and more products are being manufactured whereas, the marginal revenue will remain the same as P. Now, in such a scenario here we are observing that in this column we have the number of samosas that are sold.

This is the price, this is the total revenue and the marginal revenue is 6 in each case, but the marginal cost increases. So, let us say that the marginal cost increases like this 2 3 4 5 6 7 8 9. So, this is the marginal cost. Now, we can also talk about the total cost and total cost is equal to the fixed cost and the variable cost.

What we are saying here is that total cost is equal to the fixed cost plus the variable cost. But, we can also write that total cost is equal to say at stage n plus 1 is equal to total cost at stage n plus the marginal cost for n plus 1.

This means that at every step of computing the total cost we can use the total cost in the previous step and the marginal cost. Now, marginal cost as we have seen it goes on increasing. So, in this table we are observing that the marginal cost is increasing and the total cost.

So, the total cost for selling 0 items would be the fixed cost which in this case is 3 rupees. And, for every step we can do a computation by adding marginal cost to the total cost in the previous step that we had seen here.

The total cost at any stage say that nth nth stage is the total cost in the previous stage plus the marginal cost at that particular stage. So, if the total cost for this point is 2 plus 3 is 5, for this cell it will be 3 plus 5 is 8, for this cell it is 4 plus 8 is 12, for this cell it is 5 plus 12 is 7 teen and so on. So, this is the column for the total cost.

Now, profit is defined as total revenue minus total cost. So, we are taking this total revenue minus total cost. So, 0 minus 3 is minus 3 rupees, 6 minus 5 is 1, 12 minus 8 is 4, 18 minus 12 is 6 and so on. Now, in this case we can observe that the profit when 0 items are sold is negative.

Because the total revenue in this case is 0 because no items are being sold, but still the fixed costs need to be paid. So, in this case the profit is negative. Then the profit increases reaches a maximum and then starts to decrease and we are observing the change in the profit which is given as marginal revenue minus marginal cost.

Now, in the case of change in profit what we are asking is if one more item is being produced and sold, what is the change in the profit? So, when one more item is sold, the revenue that the

firm will be getting is the marginal revenue.
But the cost of producing it will be the marginal cost for that particular item. What we are asking is the firm has already sold n items and it wants to sell now n plus 1 items. So, for this one item that the firm wants to sell, what is the marginal revenue? What is the marginal cost? Now, the difference will give us the change in the profits.
The marginal revenue minus marginal cost: here you have marginal revenue, here we have the marginal cost. Marginal revenue is fixed, marginal cost is increasing. So, when we subtract marginal cost from marginal revenue we start from a large value.
But this value goes on decreasing because MC is increasing whereas MR is constant. Here we are observing that the change in the profit is reducing, that is when the firm is producing larger and larger amounts of products, then after a while the change in the profit will become negative which means the profits will start to decrease.
If we plot these values we will find a curve like this. So, the first thing is the price which is shown here at this blue line and the price in this case is constant. It is fixed at 6 rupees. So, this is what we are talking about: the price is fixed and so, we are getting a straight line, this straight blue line is the price line.
The total revenue is proportional to the quantity that is shown because total revenue is given as total revenue is P into Q. Now, because P is constant it is a straight line so, total revenue is proportional to the quantity of goods that have been sold and which is what we are observing here.
In the case of this green line the more is the quantity the more is the total revenue and it is a straight line because it is proportional to Q and the proportionality is a fixed constant. Then the total cost increases with the rising marginal cost.
The total cost is shown here in the red curve. So, the total cost is increasing, but then the rate of increase also goes on increasing, which means that earlier there is a very small change in the total cost with more and more items that are being produced the change is much larger and this is because of the law of diminishing marginal product.
Now, with more and more quantities that are being made the efficiency of the inputs reduces which means that for producing an extra quantity of the good more cost needs to be put in. And, so, we are observing a curve that increases like this.
Now, the total cost curve shown in red does not start from 0, but it starts from a finite value and that finite value is the fixed cost. So, when 0 quantities of things are being produced and sold, even then there are certain fixed costs and those fixed costs will show themselves in the total cost.
Next we can have a look at the profits. Now, profit increases reaches a maximum value and then starts to decrease which is this black line. Now, the profit is given by total revenue minus total cost. The difference between both of these is the profit.
Where both of these are roughly the same we will have a profit of 0 or near to 0 when the difference is large, then we will have a larger amount of profit. So, profit goes to a maximum and then it goes on decreasing and profit is maximum where the price is equal to the marginal cost. So, what we are saying here is that if you plot the profit.

This is the profit and the profit reaches a maximum and the profit reaches the maximum where the price is equal to the marginal cost. Now, the marginal cost is shown here. So, this is marginal cost and it is increasing and at the point where it touches the price curve and price is a straight line which is equal to marginal revenue. So, at this point the profit is maximum. Now, why is that?

The thing is to any point to the left of this point this is our point that we are interested in and at any point to the left we have a situation where the marginal revenue which is given by the price is greater than the marginal cost.

What we are saying here is that at points on the left, the marginal revenue which is equal to price is greater than the marginal cost. Now, if the marginal revenue is greater than the marginal cost it means that if one more item is produced, then the cost of producing that item is less.

But, the increase in the revenue that we will get will be greater which means that the production of any extra item will add to the profit. Because or for all of these points the margin and revenue is greater than the marginal cost. So, if one more item is produced we will get a larger amount of revenue, but the increase in cost will be lesser.

So, for any such point it makes sense to produce more items. So, it makes sense to move to the right. So, for all the points to the left of this point, it makes sense to move to the right. But, for any point to the right of this fixed point ; so, we are talking about this point.

At any point to the right, what is the situation? We have a situation where the marginal cost is greater than the marginal revenue which means that when any further item is produced, then it costs more to produce that item than the increase in the revenue that we will get by selling that item.

Which means that the more the items that are produced the less the profits will become which means that it does not make any rational sense to make that item. So, at any point to the right of this point we will come to the conclusion that no, we are already making a bit too much and we should be making a bit less.

All these points will try to move to the left, all these points will try to move to the right and they will reach to this point. So, for all the points to the left what we are saying is that if we increase the number of items, then we can increase the profit for all the points on the right.

We are saying that we are already making a bit too much. We should reduce the quantity and so, this will be the quantity at which the profit will be maximized. So, profit is maximum where P is equal to MC which is the price is equal to the marginal cost of production.

We can also say that profit is maximum where MR minus MC is equal to 0 because marginal revenue minus marginal cost is equal to 0 that is this is the marginal revenue line which is the price line and this is the marginal cost line. And, we are saying that profit is maximum where the difference is 0.

That is, if this is the difference then and if you take another point, say this point so, we are taking these two points. Now, at this point there is a certain amount of profit because the margin and revenue is greater than the marginal cost, but if more items are produced here again we are getting a profit because the marginal revenue at this point also is greater than the marginal cost of production and similarly at this point.

For all of these points, the marginal revenue is greater than the marginal cost, but once we cross this point we will reach a point where the marginal cost of production is greater than the marginal revenue that we will get. After this point we should stop producing any more items because if we cross this point.

Then we will reach a stage where it costs more to produce the goods and we will get a lesser amount of revenue in return, that is, the profit will go down. So, the profit is maximum at the point where this difference is 0 because if this difference is greater than 0.

Then there is still a scope to produce more items and get more profit. Whereas, if this difference is negative then it means that we are already producing a bit too much. So, the point at which this difference is 0 is the point of the maximum profit which is what we are observing here.

So, this is the point of the maximum profit. Next we can also say that profit is maximum at the peak of the profit curve which is very obvious because when we are reaching the peak of the profit curve that is the maximum profit after that the profit will decrease.

Now, the next thing is that we can have a maximum profitability, but how do we maintain that profitability for a long period of time? That is the next question that we need to analyse. So, if you look at this chart we have the number of samosas that are sold, the price and the price is fixed.

The marginal cost increases; the total cost also increases; the fixed cost is fixed and fixed cost is given by the total cost for 0 production which is 3 rupees. Now, the difference between the total cost and the fixed cost will give us the variable cost.

For 0 items it is 3 minus 3, 0; for 1 item it is 5 minus 3 is 2; for 2 items it is 8 minus 3 is equal to 5. So, we can compute the variable cost and the variable cost is equal to total cost minus the fixed cost and this is because total cost is fixed cost plus variable cost.

We can compute the variable cost in this manner. Now, with this we can also compute the average total cost and the average variable cost. Average total cost is total cost which is this value divided by the quantity that is sold.

Total cost here is 5 divided by 1 is 5, for this value it is 8 by 2 is 4, then 12 by 3 is 4, then 17 by 4 is 4.25 and so on. So, this is the average total cost. We also have the average variable cost which is variable cost divided by the quantity sold.

Here it is 2 by 1 is 2, then 5 by 2 is 2.5, then 9 by 3 is 3, then 14 by 4 is 3.5 and so on. So, we can compute the average total cost and the average variable cost. Now, the thing is when we plot these values together.

We have a fixed price which is equal to the marginal revenue, we have a marginal cost that goes on increasing and we have observed that the firm earns the maximum profit where the marginal cost is equal to the price which is what we have seen before.

Profit is maximum where P is equal to MC in this case when P is equal to MC we are getting the maximum profit. Now, if you look at the average total cost it decreases and then it increases. And, we have observed this before because when we look at the total cost.

Now total cost is fixed cost plus variable cost. Now, the average total cost will be given by total cost by Q is equal to FC by Q plus VC by Q. Now, in this case, the FC is a fixed value because this is a fixed cost whereas, the variable cost goes on increasing.

Now, if we look at our chart the average total cost reduces and then it increases whereas, the average variable cost goes on increasing. Now, why does the average total cost reduce first because the average total cost is this value plus this value.

Now, in the beginning when we have a very low quantity of goods that are being produced then we have a substantial amount of fixed cost, but the variable cost is very close to 0 because we are not producing anything. So, what we get here is that in the beginning the fixed cost is very much greater than the variable cost which means that FC by Q is very much greater than VC by Q.

And, in this case, we can say that the average total cost is approximately equal to FC by Q because FC is very much greater than VC. So, we can neglect this term and we can say that average total cost is roughly equal to FC by Q. Now, FC is fixed because this is a fixed cost, Q when it goes on increasing the average total cost will go on decreasing.

So, in the beginning what we observe is that the average total cost, it goes on decreasing. Because here the fixed cost is more, the variable cost is very small and with increasing quantity of goods the average fixed cost goes on decreasing. But, then at a later stage we will find that average total cost is total cost by Q is fixed cost by Q plus variable cost by Q.

So, later we will find that the variable cost has increased and so, the variable cost is now greater than the fixed cost. When that happens, we can write that TC by Q or the average total cost is approximately equal to VC by Q because in this case we can neglect this term because this is now very much less than VC by Q.

So, average total cost in this case is approximately equal to VC by Q which is equal to the average variable cost and what we have observed here is that the average variable cost goes on increasing. So, in the later stages we will find that the average total cost also goes on increasing and this black line is showing us the average variable cost which is increasing. So, we have observed that this is the point of the maximum profitability.

But, then we can also talk about profitability in the long run. Now, in the long run what we are saying is that if this is the average total cost and if this is the price that we get as long as the price is greater than the average total cost we should be producing the goods.

Which means that, the cost of production is less, the selling price is more, so, there is some profit. It may not be a very large profit, but there is some profit. And, so, we should continue the production in the long run if the price is greater than the average total cost.

We will continue to produce goods till this point where the price is greater than the average total cost. After this point the price is less and the average total cost has increased. Now, we are moving into a point of loss and so, we should not cross this point, but this is the point for long term profitability.

In the long run a firm should shut down if the revenue is not able to meet the total cost of running because here again the firm is making decisions based on rational decision making and if the revenue is not able to meet the cost of production then the firm should shut down.

In this case what we are saying is that the firm should shut down when the total revenue is less than the total cost or TR is less than TC. So, if you divide both sides by Q we will get TR by Q is less than TC by Q. Now, TR by Q this term is equal to price.

Price, because we have seen that the total revenue is equal to P into Q and so, TR by Q is equal

to P into Q by Q is equal to P. So, what we are seeing here is that P is less than TC by Q and TC by Q is the average total cost. So, a firm should shut down.

When P is less than ATC that is price is less than ATC then the firm should shut down. And, if the price is greater than ATC then in the long term a firm should enter the market. Now, remember that in the case of a competitive market we had said that there is a free entry and exit and what we are saying here is that if the price is less than the average total cost of production.

Then the firm should shut its operations and it should move out of the market. But, if the price is greater than the average total cost of production, then a firm should enter into the market and start production. So, this is in the long run.

What we are saying is if we do the supply curve in the long run we will see that this is the average total cost and we saw that the average total cost decreases then it increases. So, the average total cost and the marginal cost curve will cut the ATC at this point, the point of the minima, which is what we have observed before.

Now, above the ATC the MC curve or the marginal cost curve becomes the supply curve because the supply curve is given by the cost of producing things and so, above this price this is the supply curve. But, below this price the firm will not supply according to the marginal cost, but the firm will shut its operations and supply zero quantity.

So, when the price is this or the price is this or the price is this the firm should produce zero quantity of goods: it should not be producing at all. But, once the price has increased above the minima of the ATC, then this curve which is the MC curve, the marginal cost curve, becomes the supply curve. Now, this is in the long run.

In the short-run, the firm will have a different profitability. Now, this is because the firm will ask the question that if the total cost is not being met, are we at least able to meet the variable cost, the cost of maintenance of the firm? Now, that is the variable cost.

In the short run what we say is that the firm should continue its operations and the short run till this point where the average variable cost is less than the price which means that it is at least able to meet the cost of running. Because, there is always a sunk cost in all the operations.

A sunk cost is a cost that has already been committed and cannot be recovered which means that if there is a hotel, then there is the cost of land, there is the cost of construction and if you shut the operations you will not be able to recover this cost. So, this is already money that has been put inside.

Now, if we forget this money, if we forget that we had put so much of investment, what is now the cost of at least running the operation is what the firm is interested in knowing in the short run. So, in the short run the firm should shut down.

If the revenue is not even able to meet the variable cost of running which is like the variable cost of paying the wages of those workers that are involved in cleaning of the premises or making and serving the food. Now, in the off-season in the off-tourism season.

We should have at least that much amount of profitability that we should be able to meet the cost of these people, the variable cost of the firm. So, in the short run the firm should shut down if the revenue is not even able to meet the variable cost of running which means that the total revenue is less than the variable cost.

Now, if TR is less than VC, then dividing both sides by Q we will get PR by Q which is equal to P is less than VC by Q which is the average variable cost. So, the firm should shut operations when the price is less than the average variable cost.

And, so, in the short run the supply curve will look like this. So, if this is the average total cost, if this is the average variable cost, then above this point above the minimum of the AVC we should have the MC or the marginal cost which gives the supply curve.

But, below the average variable cost, the firm should shut operations. So, if P is less than average variable cost there should be no supply at all, the firm should completely shut down. If the P is greater than the average variable cost, then in the short run the firm should be supplying things.

But only in the short run. In the long run the firm should only be supplying if the price is greater than the average total cost. Now, in this context we can look at the profit and loss of the firms. Now, if this is the average total cost curve, if this is the price and this is the marginal cost.

Now, why is that so? We had observed that in the long run this is the supply curve of one firm. It says that if the price is less than the ATC then the firm should shut operations, but if the price is more than the ATC then this is the supply curve.

If the price is greater than ATC, then one firm will enter into the market. Now, in the case of a competitive market where the firms have a free entry and exit, we will have the situation that whenever the price is greater than ATC there will be some firm that will get inside.

Whereas, when the price is less than ATC, then there will be some firm that will be going down. In essence the long term market supply curve will be given by this price curve. At this price any amount of any quantity of things can be bought or sold.

Because of the free entry and exit there will be at least some firms who will be supplying the goods at this price. In the long run, the market supply becomes a straight line. At this price any quantity of goods can be bought or sold because the firms are entering and exiting from the market.

Now, the question arises at this price point the profit of the firm is 0 because the profit is given by this one; the profit is given by P minus ATC into Q. Now, in this case when P is equal to ATC, then you have P minus ATC is equal to 0.

So, 0 into Q is also equal to 0. So, the firm is not earning any profit, but still it is supplying. Now, why would we have such a situation? The answer is, because the profit is given by total revenue minus total cost and total cost also includes the opportunity cost.

Now, this is why we make a distinction between accounting profit and economic profit. Now, accounting profit is given as total revenue minus the explicit cost which is the cost for which a firm is outlying money that is the cost of say land, the cost of the inputs, the raw materials, the cost of wages and so on.

Whereas, when we talk about the economic profit we talk about total revenue minus total cost and total cost is explicit cost and the implicit cost. Now, the implicit cost is those costs for which the firm is not making an outlay of money things such as opportunity cost.

For instance, there is a person who is setting up a firm at an opportunity cost of say 1 lakh rupees because if this person was not running this firm, he would be earning a profit earning an income of 1 lakh of rupees from some other source, probably he was working somewhere and he left his

job to set up this firm.
Now, when we talk about the economic profit, we include this 1 lakh of rupees which is the opportunity cost of running this curve. So, what we are saying here is that the economic profit is the total revenue minus total cost.
And because total cost is equal to the explicit cost plus the implicit cost. Now, in this case the implicit cost is rupees 1 lakh. Now, because we are subtracting that from the total revenue and when we say that the firm will go on supplying till the economic profit is 0 rupees.
It means that 0 is equal to TR minus EC minus IC which means that IC is equal to TR minus EC. So, we have an implicit cost of 1 lakh of rupees which is given by TR minus EC. Now, because TR minus EC is a positive value, it is 1 lakhs of rupees it means that TR is greater than the explicit cost.
What we are saying here is that because this is a positive value of 1 lakh, it means that TR is very much greater than the explicit cost. The total revenue is very much greater than the amount of money that has to be outlaid by the firm for running of things.
So, when we say that the firm continues to produce at a profit of 0 rupees, it is not the accounting profit we are talking about the economic profit and in this case the TR or the total revenue minus the explicit cost it is still giving the person 1 lakh of rupees of the implicit cost.
Which means that, if the person left this firm, if the person shut down his operations and if he went back to his original job, then he would be earning 1 lakh of rupees. But, when he is running this firm and not earning 1 lakh of rupees from there he is still earning that 1 lakh of rupees from his new firm.
Which means that, when we talk about an economic profit of 0 rupees, it is still giving the person at least that amount of money in profit that he would have earned otherwise. So, the person is still having a substantial sum of money as income.
It is not the income from the wages that he was earning in his previous occupation, but this is the profit that he is earning and which is why the firms are able to work at a profit of 0 rupees. So, in this lecture we had a look at how profit is computed and how firms maximize the profit and continue to maintain profitability both in the long run and the short run. And, because the running of the firm is also related to quite a number of problems of conservation, so, it is important for us to understand what keeps a firm running.
That is all for today. Thank you for your attention. Jai Hind!