Foundation Course in Managerial Economics
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Lecture - 22
Supply Curve of Firm in Perfect Competition

Hello and welcome back to our discussion on perfect competition. We in the till the last module we discussed about profit maximization behaviour of a perfectly competitive firm and we saw that a perfectly competitive firm is a typical case where since price is given by the market average revenue is equal to marginal revenue is equal to the price and that is also the demand line a horizontal demand line that the perfectly competitive firm faces in in the market.

So what is the supply curve of a perfectly competitive firm? This is what we are going to find out because we need a supply curve of the firm and eventually we are going to develop the supply curve of the entire market and see what it looks like in a perfectly competitive market. So we are going to discuss about perfect competition and supply decision of a perfectly competitive firm.

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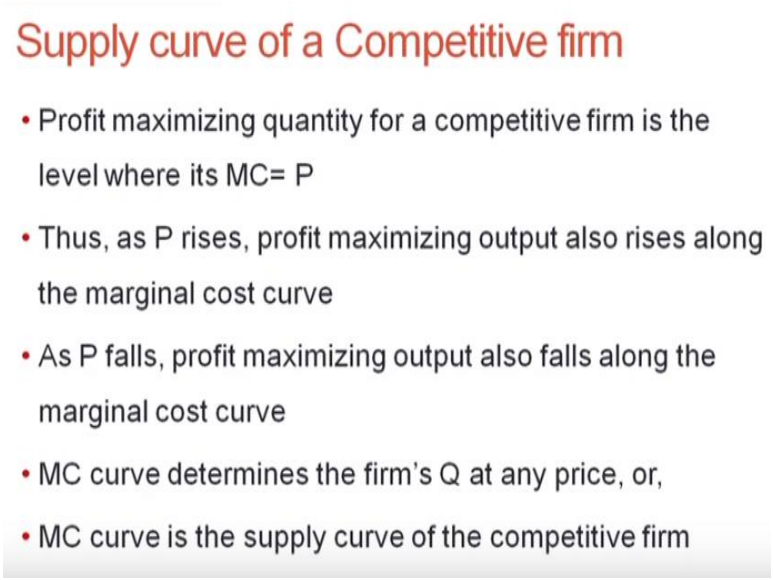

Now the supply curve of a competitive firm let me just walk you through the slide then I am going to show on the board. The profit maximizing quantity for a competitive firm is the level where its marginal cost is equal to the price. So we saw in the earlier module that the intersection of marginal cost with price is going to determine the output that the firm would like to supply.

So thus as P rises you can imagine that as the price line shifts up or down profit maximizing output also rises along the marginal cost curve. As price falls profit maximizing output also falls along the marginal cost curve. So that kind of determines that the marginal cost curve determines the firm's output at any price or marginal cost curve is the supply curve of the competitive firm. So let me just show what we just discussed in the slide. Let me show through diagram.

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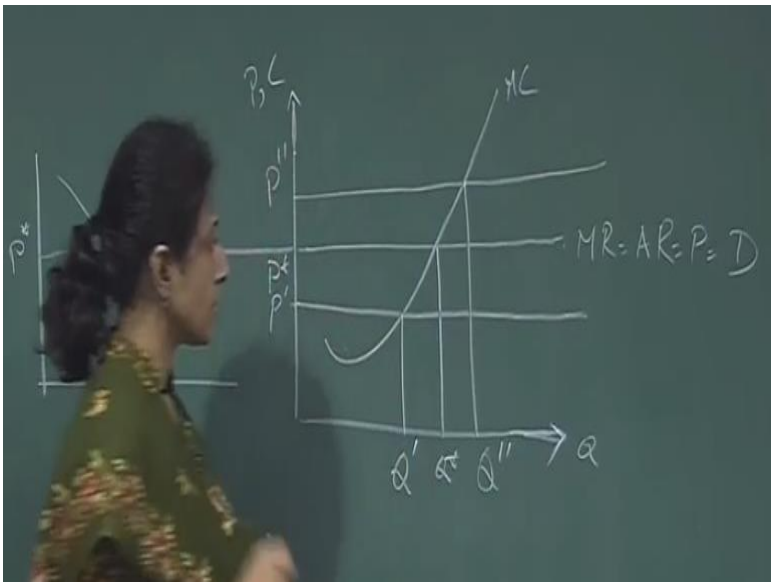

So we have price and cost here and as we saw earlier the market demand and supply they determine how much price is to be charged. So this is the price line which is given to the firm from the market and what it basically does is it tries to see where is this price line which is also its marginal revenue and average revenue and price and demand.

It tries to see the firm tries to see where does it intersect with its marginal cost curve. So this is the output level that the firm is going to supply. So the firm is going to its perfect maximizing level is marginal cost equals marginal revenue and so Q star is the optimum amount of output that the firm is going to supply when price is P star.

Now what happens when price changes? Say price falls to P prime. So when price falls to P prime again the firm is going to see where does its marginal cost intersect with its price line and so now this is the output level Q prime that the firm is going supply to the market. What happens when price goes up? When price goes up again it is going to see the intersection between MC and P and it is going to determine the new level of output say Q double prime.

So basically what we are seeing is marginal cost curve is basically tracing out the output level at various price lines. So every point on the marginal cost curve shows the supply that the firm is willing to do at that price. So at that price, any price, the quantity that the firm is going to supply is given by the marginal cost curve. So effectively the marginal cost curve itself should provide the supply curve of a firm. But there is more to it which we will discuss later but so far it suffices to say that the supply curve of a perfectly competitive firm is traced out by the by its marginal cost curve.

Now we move on to some like we when we started our discussion on perfect competition we also asked this question is the firm because it is a price taker is it always going to just keep on producing? Is it going to stay in business? What determines if the firm is going to stay in business? If it should produce any output at all or not. Whether it should think of quitting the market? How are these decisions taken in a perfectly competitive setup.

So we are going to talk about 2 situations. One is shut down which means that the firm is temporarily shutting down its production. It is not entirely quitting the market, it is just shutting down its production. It is just stopping its production and exit is when it completely winds up. It sells off everything and it just quits the market. That is the exit. What is the difference between the 2? Let us see.

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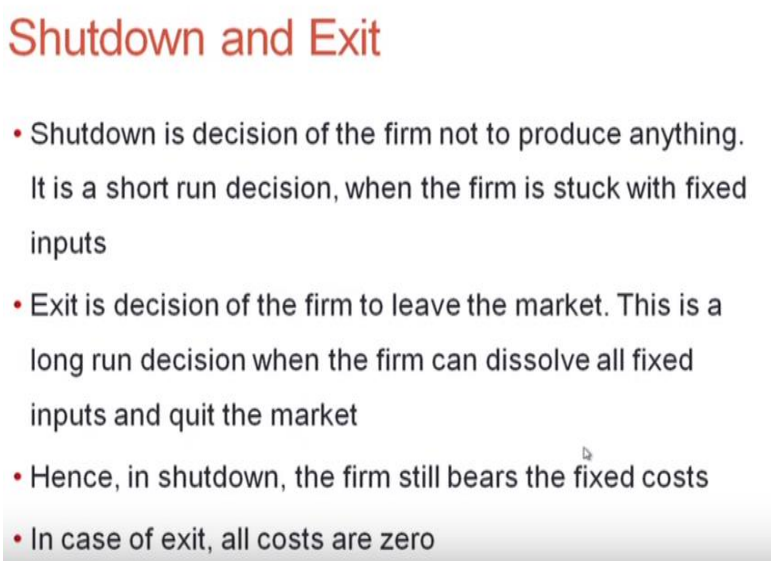

Shutdown is decision of the firm not to produce anything. It is a short run decision when the firm is stuck with fixed inputs and exit is a decision of the firm to leave the market. This is a long run

decision when the firm can dissolve all fixed inputs and quit the market. So shutdown is something which the firm can do in the short run because in the short run it is not easy for the firm to come out of its fixed costs. It is it has already incurred certain fixed cost, it has probably setup a plant, it has bought some land where it is operating or it has a huge machine which it has either borrowed.

Probably the firm is paying some mortgage some interest to which for borrowing money from the bank to buy these machineries. So all these are short run costs of the firm which the firm even if it stops production even if it does not produce anything it has to incur these costs. So the firm all that the firm can do in the short run is continue to incur these fixed cost but at least stop incurring the variable cost by stopping its production and that is called shutdown. Exit is a decision of the firm to leave the market.

So in the long run as we already discussed when we discussed about long run and short run cost curves we said that in the long run all variables are flexible. In the sense the firm can either decide to acquire more of its fixed inputs or it can decide to dispose of its fixed inputs. So everything is possible in the long run. So in the long run the firm if it is incurring losses the firm can decide to dissolve all its assets or all its fixed inputs and quit the market. That is called exit. Hence in shutdown the firm still bears the fixed cost. In case of exit all costs are zero but this cannot happen in the short run. This happens in the long run.

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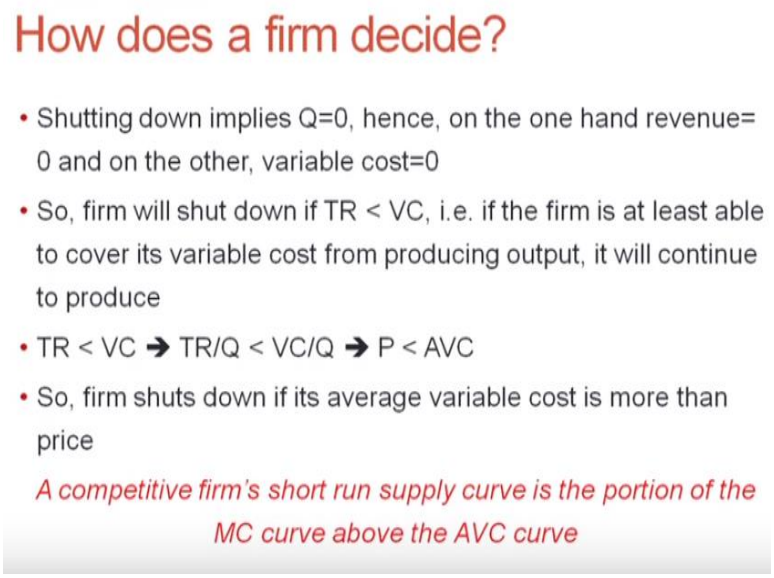

So how does a firm decide? How does a firm decide whether it should shut down or not or whether it should exit or not. Now when a firm is shutting down, when a firm is shutting down in the short run that implies that its output is 0. So when output is 0 on the one hand revenue is equal to 0 because it is not selling anything but on the other hand its variable cost is also 0 because variable cost depends it is directly proportional to the amount of output it is producing.

So this is like imagine there is a pizza joint a person a producer has come up with. He has opened a pizza joint and he has incurred certain fixed cost. He has rented that piece of he has rented some area some space to set up his shop and he has hired some people and he has bought some ovens and paying some rent for the paying some paying the electricity bills etc.

So it has already set up a infrastructure to produce pizza there and he has incurred some fixed cost and then he is running at a loss so his variable cost is basically the flour, the fuel that is required to run the ovens, the cheese, the even some of his labour force could be dependent on how much pizza he is producing. So these are his variable cost which he can cut down in the short run if he is running a loss and he may decide that fixed cost he has in any case he has to pay. Variable cost he can reduce by not producing any pizza.

So shutting down implies Q is equal to 0. So firm will shut down if total revenue is less than variable cost. That is the firm is at least able to cover its variable cost from producing output, it will continue to produce but the firm will shut down if the revenue that it is incurring by producing is actually less than the variable cost that he is incurring because he is producing those output the firm is going to shut down.

So this condition is total revenue is less than variable cost which implies that when we divide both sides by output and this is total revenue divided by Q is less than variable cost divided by Q and TR by Q is nothing but average revenue or which is equal to price P into Q by Q and VC by Q is average variable cost. So when price is less than average variable cost, the firm shuts down if its average variable cost is more than price.

A competitive firm's short run supply curve is the portion of the marginal cost curve above the average variable cost curve.

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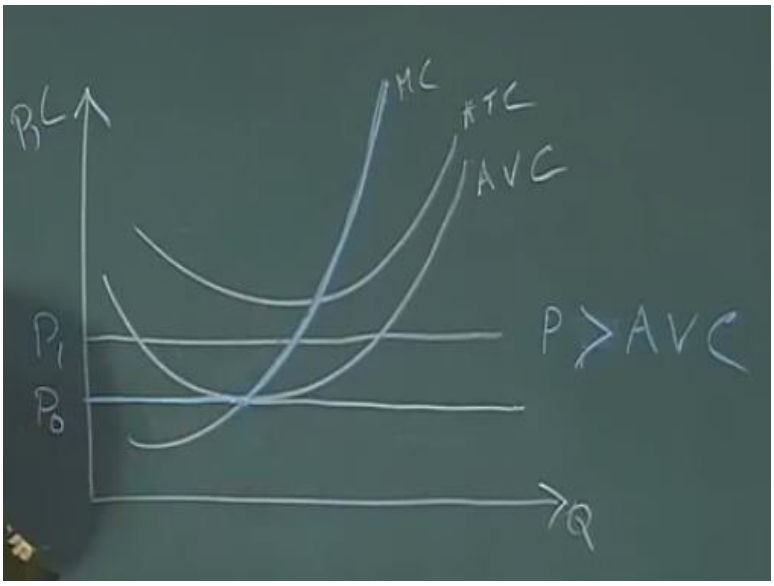

So basically the same diagram that we drew earlier. So this is the marginal cost curve and this is the average variable cost curve and this could be average total cost curve. So basically what we are seeing here is that the firm will continue to produce in the short run if its if the price is at least able to cover the average variable cost.

So this is the average variable cost and if the price falls here. Say for example the price is falling here. Say this is the price P 0. If the price falls below P 0 then the average variable cost is above the price line so the firm is going to produce only till here. So below this level if the price falls even below if the price fall below P 0 the firm is not going to produce. It is going to shut down.

So basically as we know that the marginal cost curve traces the supply curve but in this case basically the supply is till here. So the average the minimum of the average variable cost and the so this blue line is the supply decision of the firm.

In the short run the firm is going to supply till the average minimum average variable cost and below it will refuse to supply because if the price falls below the minimum of the average variable cost then the firm is going to incur a loss and it does not make sense for the firm to continue production so it is going to produce as long as the price is above the average variable cost and note notice here that average total cost is much above the price line although the average variable cost is below the price line.

Say if the price is P 1 the price is P 1, the firm will continue to produce because here the price is covering the price is covering the average variable cost. Price or price here price is at more than the average variable cost. So in the short run the firm will continue production because here the

price is above the average variable cost. But the firm is not is going to stop production below P 0 because here it this these price levels will not be able to cover the minimum average variable cost curve. So this is the average this is the supply so the blue line is the supply curve of the in the short run supply curve of the perfectly competitive firm.

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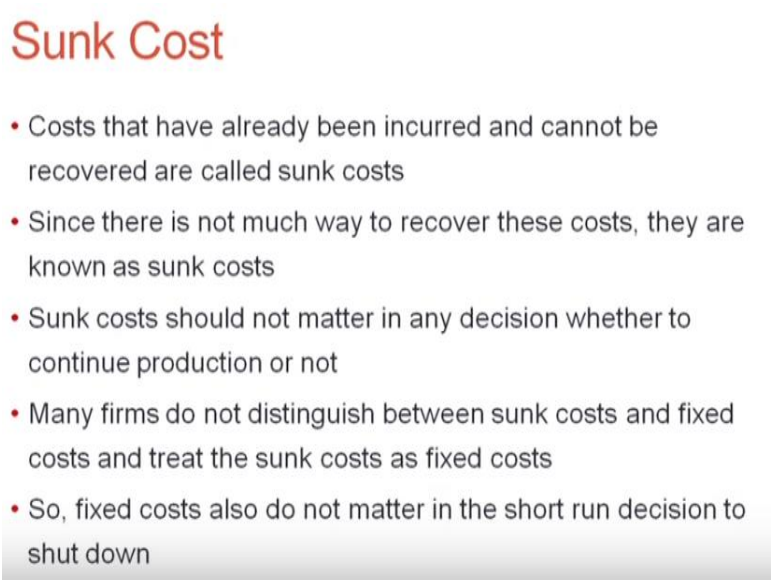

Next we are going to discuss about something called sunk cost. What is sunk cost? The costs that have already been incurred and cannot be recovered are called sunk costs. So since there is not much way to recover these costs they are known as sunk cost and sunk cost should not matter in any decision whether to continue production or not and many firms do not distinguish between sunk cost and fixed cost and treat the sunk cost as fixed cost. So fixed costs also do not matter in the short run decisions to shut down.

So in the short run decisions fixed cost does not matter because fixed cost you have to in any case pay. Fixed cost say for example the producer has rented a building to start his production he has leased a property for 1 year.

Then he is stuck with that property for 1 year and where he had decided to manufacture something and maybe his short run variable cost is not getting covered by the price that is prevalent in the market but still he has to pay the rent for the property that he leased for that period of 1 year of time. So 1 year is the short run for which he is stuck with this fixed cost. But after 1 year he can dispose of this fixed cost and come out of this situation.

So fixed cost is not exactly the sunk cost as we are defining here. Sunk cost is like let me give an example. Say for example someone has spent 2 years getting a law degree. He has spent a lot of money to get a law degree and then he gets the degree and after that he decides that I would really do not I would not like to pursue a legal profession. Instead I am going to be a pizza joint owner.

So I am going to just sell pizza so where he is not using his law degree. Now the cost that he has incurred in getting the law degree that is a sunk cost. That has already been done and that should not influence any of his future decisions. That should not influence any of its future decisions because that cost has already been incurred and that is not going to affect any of his production decisions in the future.

So similarly another example is say for example the pharmaceutical industry. They spend a lot of money on R&D and to come up with new drugs etc. and the huge amount of money spent on that. But whether the company is able to come up with new drugs or not that is not guaranteed. So the amount of money that the company spends in R&D is basically a sunk cost for the company and that should not influence any of its production decisions for the future. On the other hand fixed cost is not exactly sunk cost.

Fixed cost is basically the infrastructure it has created to produce and which has a short in the short run it is stuck with that but in the long run it is possible to salvage it. It is possible to dissolve it. It is possible to dispose it of. So that is fixed cost which is not exactly the sunk cost that we are defining here but nevertheless some producers some producers treat the sunk cost as fixed cost and they basically spread the sunk cost they have that they have incurred.

Say for example they have the a pharmaceutical company can do that, that they have incurred certain amount of cost in the laboratories and they basically spread this cost over future years of production and show it as fixed cost. So that is possible technically but here the way we are defining sunk cost is the sunk cost should not influence any decision of the firm whether to stay in business or quit.

Secondly so to give another example so it is the distinction between fixed cost, sunk cost, variable cost is important for a firm or an organization to know it should understand which of the 3 costs is more predominant in its line of business. Say for example the hardware industry. Say for example a industry where personal computers are manufactured.

So in this kind of production the variable cost is predominant because the micro processing units, the hard disks, the sound and video cards, these are all variable costs because they depend or they will be dependent on the number of units of production. So they will be variable cost and that will be more predominant in the entire production process.

On the other hand a software industry or software firm is going to incur a lot of sunk cost. It may spend a lot of money in developing certain applications which there is no guarantee whether they will be bought or not where there will be any demand for them or not. So a software industry has a lot of sunk cost. A sunk cost is a major part of its cost.

Again say for example the or coming back to the example of the pizza joint in case of a pizza joint probably the proportionately the predominant cost is the fixed cost where to start the pizza joint one has to incur a lot of fixed cost for setting up the place, for decorating the place, to have the kitchen and equipments in place the chair table setup ambience everything.

That is the fixed cost and variable cost is comparatively lower. Variable cost is comparatively lower in case of a pizza joint. So these are the distinctions which are more important which are important for a business to understand when it is getting into the business to understand more of its cost, the nature of the cost that it is going to incur.

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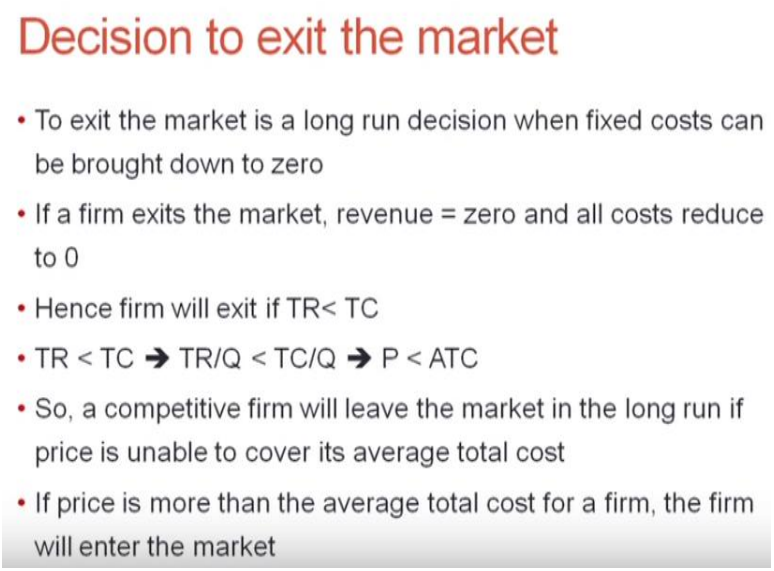

Next we are coming back to our shut down and exit decisions. Now we are going to talk about decision to exit the market. To exit the market is a long run decision when fixed costs can be brought down to 0. If a firm exits the market revenue is equal to 0 and all costs reduce to 0.

Hence firm will exit if total revenue is less than total cost. So total revenue is less than total cost implies that price is less than average total cost. So a competitive firm will leave the market in the long run if price is unable to cover its average total cost. If price is more than the average total cost for a firm the firm will enter the market. So this is not only about exiting the market it is also about entering the market. So if price is more than average total cost, if the price is more than the average total cost for a firm the firm will enter the market.

So basically the firm looks at the price and the relationship between the price and the difference between price and average total cost. So it can be a decision making variable for the firm whether to enter the market or to exit the market. So if the price is more than the average total cost of the firm and it has not entered the market yet it may it sees the potential to make some profit in this market and it is going to enter the market.

On the contrary in the long run if the firm is not able to cover its average total cost so in the long run the firm may decide to quit the market and basically dissolve all its fixed as well stop as soon as it stops producing its variable cost goes down to 0 and in the long run it has the choice of disposing of its all fixed assets or fixed inputs and come out of the market so that its cost come down to 0.

So that brings us to the end of our discussion on firms, how does the how does the firm, a perfectly competitive firm decides decide its level of output. How does it decide its supply decisions in the short run and how does it decide whether to stay in business whether to shut down in the short run whether to exit the market in the long run. So these are the discussions that we have done so far.

In the following module we are going to talk about the market supply. So far we have talked about the firm but in the following module we are going to talk about the perfectly competitive market like in totality how does the market supply curve look like and how do the firms behave in the long run as a part of the market in a perfectly competitive environment. Thank you.