Foundation Course in Managerial Economics
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Lecture - 14
Efficiency and Market Equilibrium

Welcome back to the discussion. We have been talking about policy intervention by the government and we discussed about and everything we are discussing in the demand supply framework still and in the previous modules we looked at price regulations by the government, we looked at taxes by the government and what happens to incidence of tax, how does elasticity impact taxes etc.

We have talked discussed about all that and in this last module of this entire session or in this entire section of the lecture on demand supply we are going to talk about something a little more theoretical. In the very first class we said that market is usually a best of way of allocating resources and today we are going to try to understand why we said so. So we are going to talk about that and we are going to say that so does that mean that the market equilibrium is the most efficient outcome in case of any market transaction. So is that the most efficient outcome?

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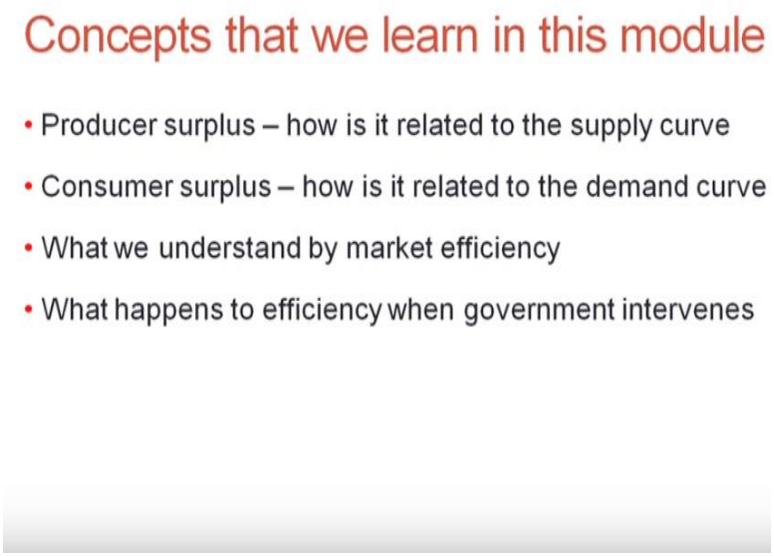

This is what we are going to discuss and in the process the concepts we will be talking about introducing and understanding a few basic concepts which are firstly we are going to talk about

something called producer surplus. So how is it related to the supply curve? So we are going to discuss about something like producer surplus and how is it related to the supply curve.

Then we are going to talk about consumer surplus, how is it related to the demand curve? Then we are going to define market efficiency or we are going to see how what is market efficiency and how producer surplus and consumer surplus they can explain market efficiency and next we are going to see what happens to efficiency when government intervenes.

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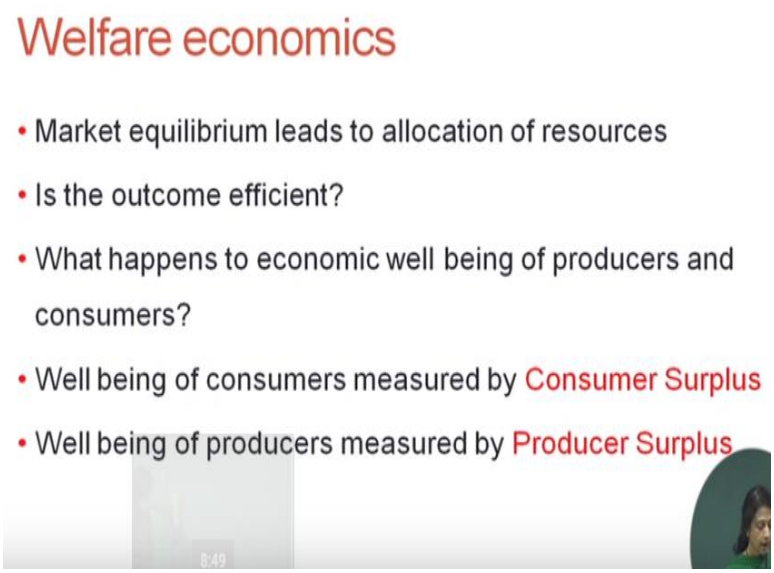

So this is all about very fundamental of a area of economics called welfare economics where we are going to basically try to define efficiency and we are going to say what is welfare economics is basically it talks about the wellbeing of all the participants in the market. So any kind of market equilibrium if it is what is it doing to the wellbeing of the producers and what is it doing to the wellbeing of the consumers.

So market equilibrium leads to allocation of resources. This we already discussed in the earlier lectures and we said that in the market equilibrium it is decided that the intersection of the demand and supply is going to give us the equilibrium price and quantity. So the quantity is decided in the market how much quantity of any good the supplier will be selling in the market and that decides how much of resources are going to be allocated and who buys this good. That is also decided through the market equilibrium people who are willing to pay the most for that good are going to buy that good.

So the market equilibrium that we get, is that a efficient outcome? That is also what we are going to see and what happens to economic wellbeing of producers and consumers and economic wellbeing of producers and consumers we define or we explain the economic wellbeing through something called the consumer surplus for the buyers and something called the producer surplus for the sellers. So let me explain.

So first let me explain what consumer surplus is. Let me start with consumer surplus and let me explain what consumer surplus is and so the consumer surplus I am going to illustrate through the demand curve.

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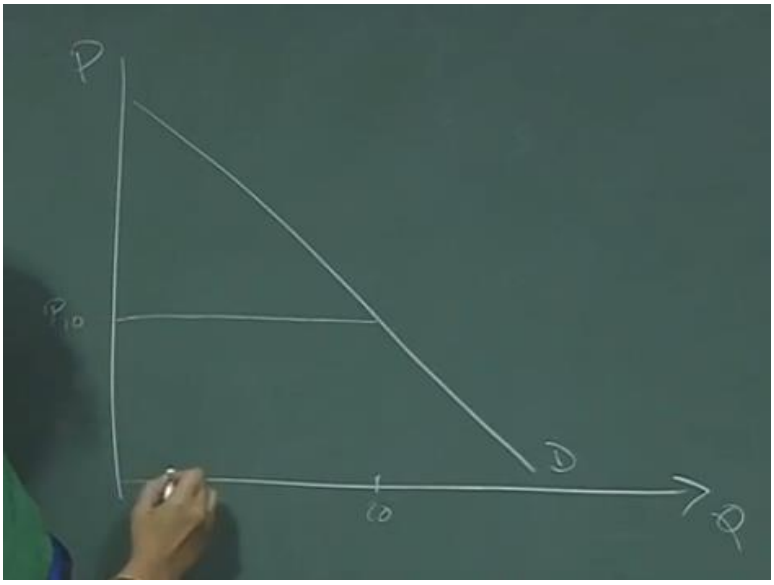

So basically we are defining there is something called willingness to pay and what is the demand curve? What is the demand curve? Demand curve is basically every point on the demand curve every point on the demand curve so every point on the demand curve gives us shows us how much of the quantity the buyers are willing to pay.

So at so if the quantity is this much so if this is the quantity of say 10 units buyers are willing to pay a amount of say P 10. So these are the various willingness to pays of the so every point on the demand curve is the expression of willingness to pay by the consumers. So this is the willingness to pay by the consumers and let us start with a very simple economy.

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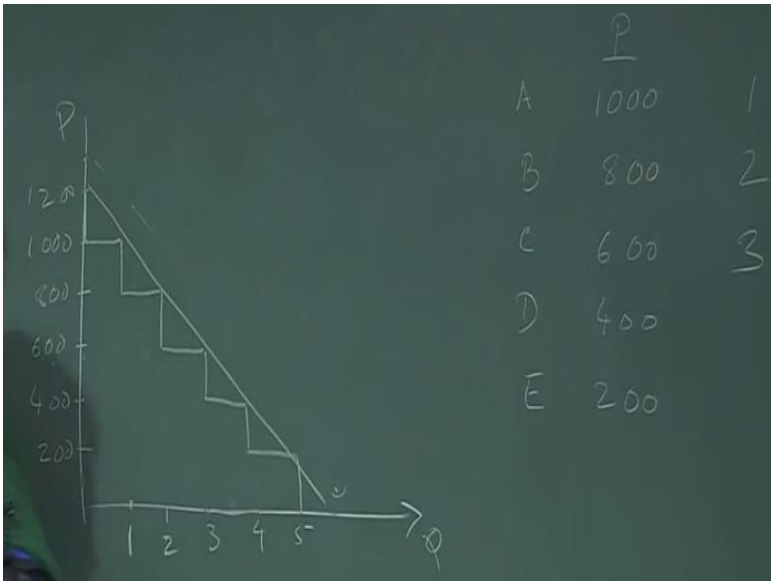

Let us start with a very simple economy where there are say 5 people A, B, C, D and E and say they are purchasing say t-shirts, t-shirts of IIT probably so they are buying t-shirts and the prices that they would be willing to pay so they have the demand curve they come to the market with some kind of demand curve.

So may be A is willing to pay a price of 1000 per t-shirt. Now B is willing to pay a little less. He would like to pay 800. C pays even less say 600 and D pays and E has a very low willingness to pay of say Rs 200. So in such a situation, in such a situation what happens in the market if the price is more than 1000 Rs? So if the price is more than 1000 Rs there are no takers. So there are basically 0 people who are willing to buy this t-shirt.

When the price is 1000 there is one person who is willing to purchase or in terms of t-shirts you can say that there is 1 t-shirt can be sold or if the price is 800 there is one more person. If the price is 800 B is willing to purchase and obviously A is also willing to purchase because his maximum willingness to pay is 1000. So here 2 t-shirts will be sold.

When the price is 600 C enters the market. He is willing to buy one, B is willing to buy one, and A is also willing to buy one. So here the price is then 3 t-shirts will be sold. So this is how we so we can draw a step diagram over here. So if the prices are 200, 400, 600, 800, 1000, and say 1200. So if the price is more than 1000, 0 people are willing to buy the t-shirt.

So when it is 100 one t-shirt will be sold; 2, 3, 4, 5. So basically it is 0 then 1 t-shirt will be sold and here 2 t-shirts will be sold 3 will be sold 4 will be sold and 5 will be sold. So basically the this is this step diagram that I have drawn from here this is this kind of looks like the demand

curve. It is a negatively sloping curve or where the price when the price is falling the amount demand is increasing.

So this is a step diagram and this is how the demand curve is drawn and imagine a market where there are infinite number of buyers. Lot of plenty of buyers are there. In that case these steps will come closer to each other and gradually when the number is too high you we are going to get a smooth demand curve. We are going to get a continuous demand curve.

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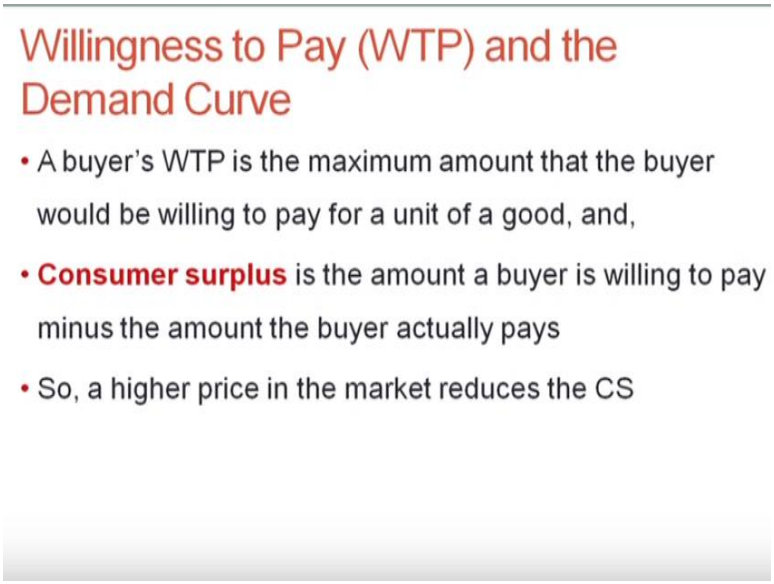

Now so coming back to the slides a buyer's willingness to pay is the maximum amount that the buyer would be willing to pay for a unit of good and consumer's surplus is the amount a buyer is willing to pay minus the amount the buyer actually pays. So let me again explain through the diagram. So basically when the second when the price is 800, B is paying a amount of 800 which is exactly equal to the amount that he would like to pay. It is not less than that.

But for A he is paying 800 so for him there is a extra benefit that he is getting by buying the t-shirt at 800. So for A there is a surplus. There is a kind of surplus of consuming this t-shirt for a price of 800 so basically A gets a surplus of 200. So in case of when the price is 600, A gets a surplus of 400 and B gets a surplus of 200.

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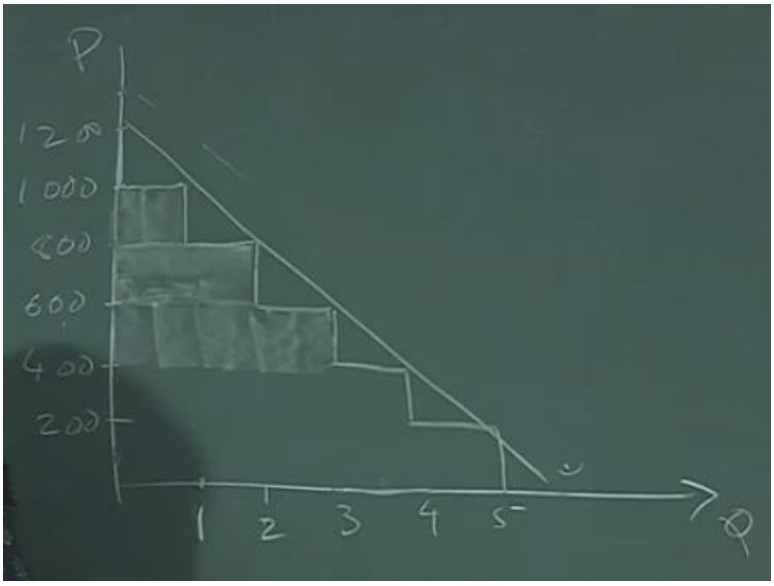

So basically what we are seeing here is that all this area this is the surplus. So for A this is the surplus when he buys it for 800 Rs. For both of them this is the total area of the surplus when it is when the price is 600 this entire area of 400 this is for A and additional this amount of 200 is for B. So similarly if the price goes down even lower, then this is the amount of surplus that all the people who are entering the market or buying the product they are going to get.

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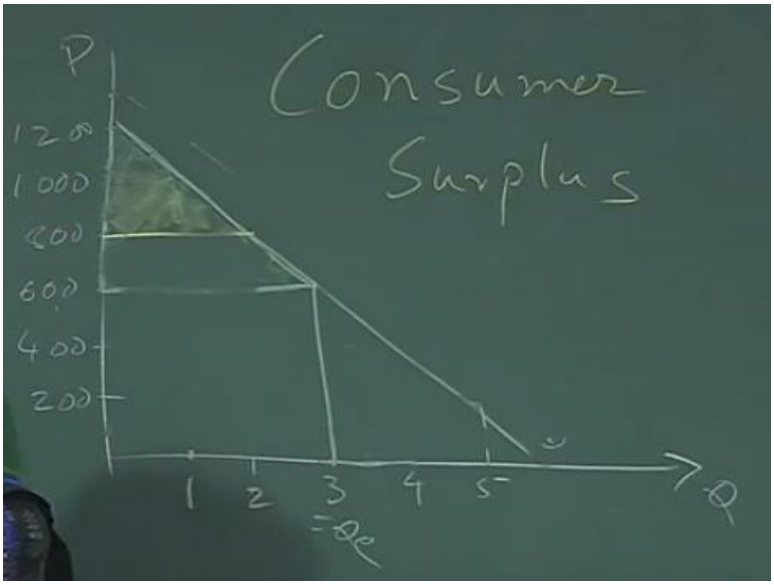

So if it is a very smooth lot of people are there and it is a smooth demand curve we can imagine if it is a smooth demand curve it is easy to imagine that if the price is 600 all the people who are buying the t-shirt and who had willingness to pay more than 600 they all have entered the market and they all are going to buy the t-shirt for 600 Rs and together they are going to get a surplus

equal to this area of the triangle. So they are going to get a surplus which is equal to the area of the triangle.

So this is the market if this is the market price if the say P e is the market price if the market price P e is 600 all these people if the market price is 600, 3 t-shirts will be sold and all these people who were who had willingness to pay in this region, in this region every person if every buyer in this region has a willingness to pay which is more than 600 or equal to 600, this last person has a equal to 600. So all the people who are here they everyone is going to buy the t-shirt and for all these people this is the consumer surplus that they are going to get.

So consumer surplus is the amount the buyer is willing to pay minus the amount the buyer actually pays. So a higher price in the market reduces the consumer surplus. So obviously higher price in the market reduces the consumer. If the price now goes up to 800 if the price goes up to 800 we lose the consumer surplus in this area and consumer surplus is now less, it is only this portion. So this is the consumer surplus now. So a higher price in the market reduces the consumer surplus.

Now that was our illustration of the consumer surplus. This is consumer surplus. So this is consumer surplus and now we are going to talk about the supply curve and we are talk about something similar the surplus that a seller also gets in the market and that is called the producer surplus.

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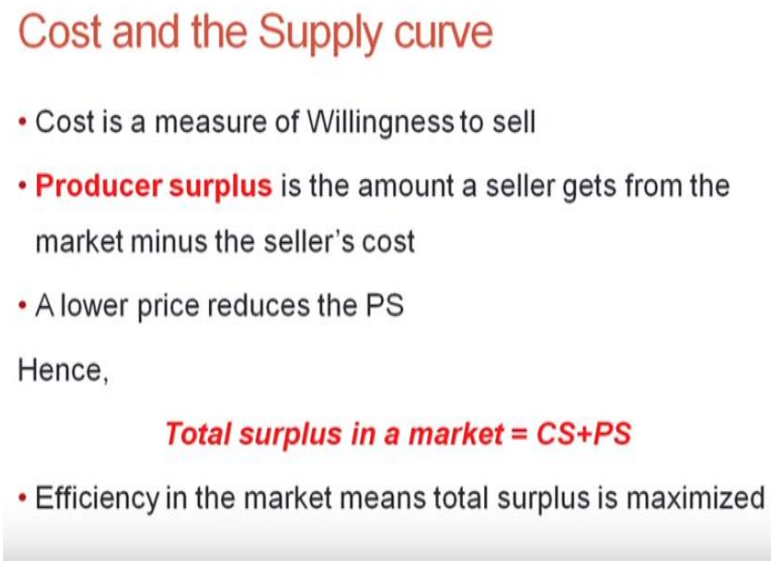

So for the seller the cost is a measure of willingness to sell. So cost is a measure of willingness to sell. That is every seller has to incur some cost to supply a product in the market. So every seller has to incur a cost to supply a product in the market and that is the that cost is the minimum amount that he would like to charge to supply any product in the market and what is that cost? That cost is anything.

Any or the cost of all his ingredients, his labour, his opportunity cost every kind of cost that he incurs in supplying a product in the market that is the minimum price that he would accept from the market to stay in the market. If the price goes below that cost it does not make sense for he is going to make a loss and it does not make sense for him to continue to supply in the market. So basically cost is a measure of willingness to sell in the market.

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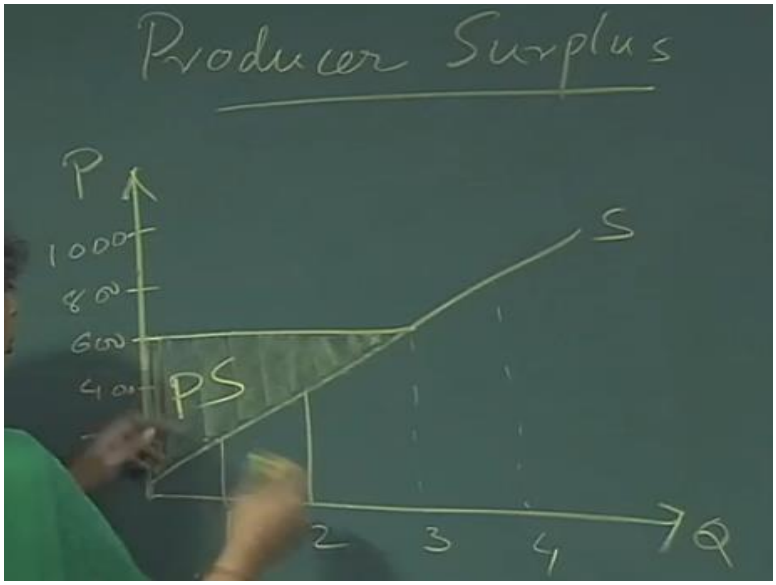

So let me draw a supply curve here. So this is we are trying to draw the producer surplus. So as I said this is the say this is the supply curve this is the supply curve of the producer and every seller every seller there are there are again like the same way that we had buyers there could be sellers in the market. So this is say 200, 400, 600, 800, and 1000. These are the prices and there is one seller in the market who can actually supply at when the price is 200.

When the price is as low as 200 there is probably one person who is willing to supply. When the price goes up 400 there one more person enters the market, he is willing to supply a unit and so he is willing to supply and the second the first person for him also now the price is more than his

cost. So he is also willing to supply; so say 2, 3. So this way so as the price goes up in the market more and more sellers enter the market and they are willing to supply.

Now imagine a situation where the equilibrium price in the market that is arrived at P e is equal to 600. When P e is equal to 600 this last person the last seller who has entered the market because the price has reached 600 he does not make any profit. For him the cost is this is his willingness to pay and this is the price that he is getting. So he is good he is fine with it. He sells the product in the market. His price is equal to his equal to the willingness to sell.

So he enters the market but every other sellers in the market for whom the willingness to pay or sorry I am sorry it is not willingness to pay it is willingness to sell. So every seller in the market for whom the willingness to sell was at a price lower than 600, they all are going to sell in the market. So they are all going to sell so imagine this first person the first seller in the market who has who operates at a very low cost.

His minimum cost is 200 or his willingness to sell is at the price of 200 that is 200 is the minimum price that he is willing to accept and because his cost is 200 now when the market price is 600 he gets a surplus. For him there is a surplus. So he gets a surplus. So the next person who is willing to for whom the willingness to sell is at a price slightly more than 200 he also gets a surplus.

So similarly every person here who have willingness to sell at a price which is lower than 600, they all get a surplus or a profit by being in the market. So they all get a surplus and this is the total amount of producer surplus or this is the total amount of surplus that the producer is getting in the market. So this is the total amount of the surplus that the producer is getting in the market and this is called the producer surplus or P S.

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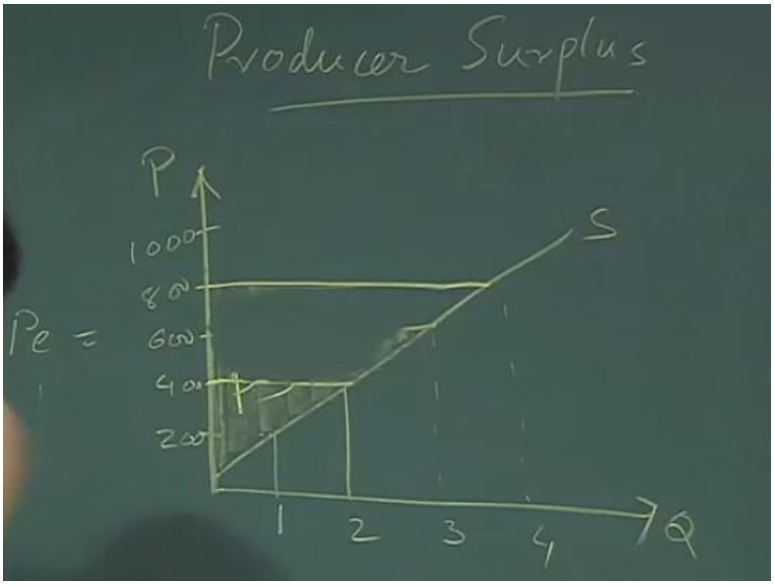

So what happens when the price the producer surplus what happens to producer surplus when the price goes up? When price goes up more sellers enter the market with more surplus say if it becomes 800 the producer surplus goes up. Now when the producer when price goes down if it is 400 this region of producer surplus is these producers all exit the market because price is now lower than their willingness to sell and so producer surplus goes down.

So basically producer surplus is the amount the seller gets from the market minus the seller's cost. A lower price reduces the producer surplus. Now hence total surplus in the market. So what is the total surplus in the market? Let us draw it neatly.

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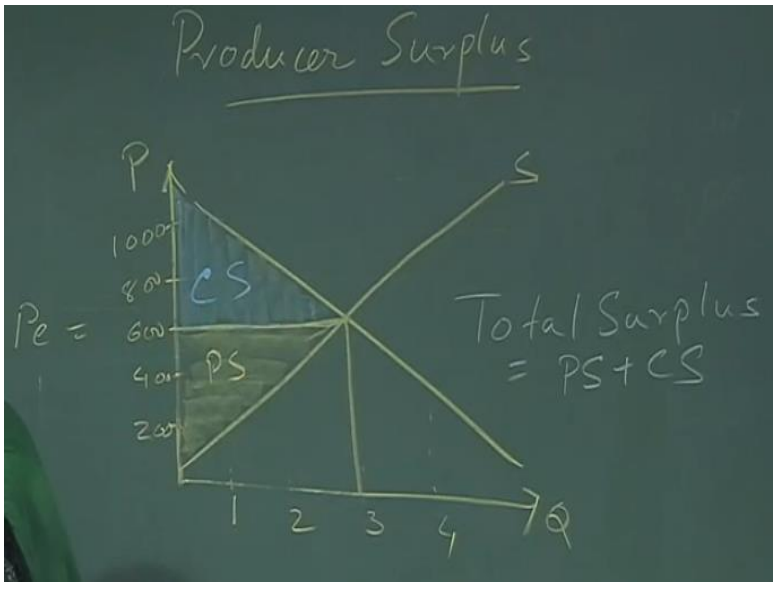

So this is the supply curve and this is the demand curve. This is equilibrium price, this is equilibrium price. Now which part is the producer surplus? As we already drew, this is the producer surplus, this is the producer surplus P S and this is the consumer surplus or C S. So when a market reaches a equilibrium they intersect it reaches a equilibrium at a price of the intersection of the two.

Both the producers and the both the producers and the consumers receive some surplus in the market and these surpluses are shown in this diagram. So this these surpluses are as shown in this diagram. So this total surplus in the market is then now what is the total so we going back to our original topic of discussion is efficiency. We were saying that if it is a efficient outcome. So we are saying that or we talked about wellbeing of the producers and suppliers in the market. So what happens to wellbeing of the consumers?

So wellbeing of the consumer is measured by this region. So the consumers wellbeing is the this region and the producers wellbeing is measured by this region and total wellbeing of the market players or the total wellbeing of the economy is equal to this total surplus. So total surplus is equal to producer surplus plus consumer surplus. So total surplus is equal to this region of producer surplus and consumer surplus and efficiency in the market means total surplus is maximized.

So we have found a way of measuring the wellbeing of the consumer as this consumer surplus wellbeing of the producer as producer surplus and so the wellbeing of the entire market is maximized if we can show that this area is maximum in the case of the market equilibrium or in other words if we are asking the question that if the market is left to itself the outcome that happens in the market the demand supply intersection and the market equilibrium that we get is that maximizing the wellbeing of the market? If it is maximizing the wellbeing of the market then it is a efficient outcome. This is what we are saying and this is what we are trying to find out.

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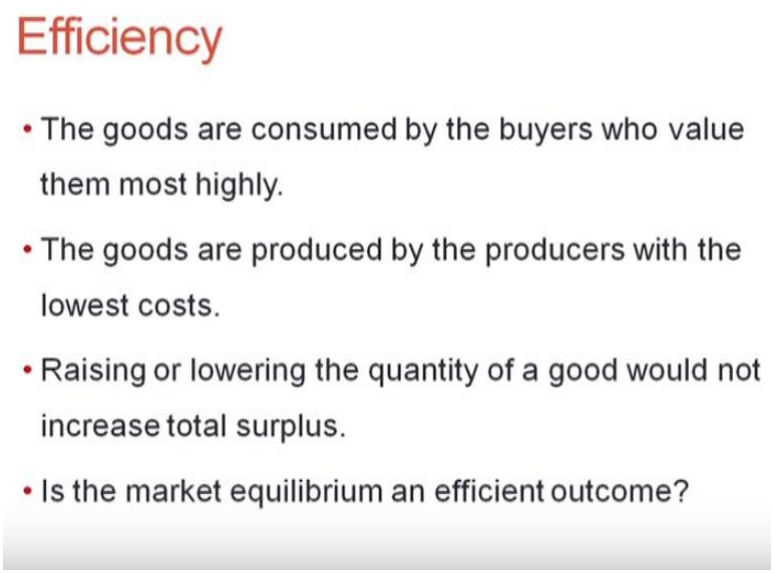

So let us try to understand what exactly we mean by efficiency. Efficiency a market outcome would be efficient if the goods are consumed by the buyers who value them most highly and the goods are produced by the producers with the lowest cost. So is that happening in this situation?

This is what we are asking that we will say that a market equilibrium or a market left to itself the equilibrium that is reached or the market outcome we are going to call this efficient if the goods are consumed by buyers who value them the most, value them the most and the goods are produced by the producers with the lowest cost.

Raising or quantity raising or lowering the quantity of a good will not increase the total surplus. So is there any way that the equilibrium that we have reached is there any way of increasing this consumer surplus or producer surplus? Any other level of output or any other level of price is that going to give us a better outcome in terms of maximizing the C S and P S?

This is what we are trying to see here and we are trying to answer the question is the market equilibrium and efficient outcome so finally we are asking that is this the most efficient outcome.

Now looking at this diagram what we can see is what happens if what happens if quantity falls.

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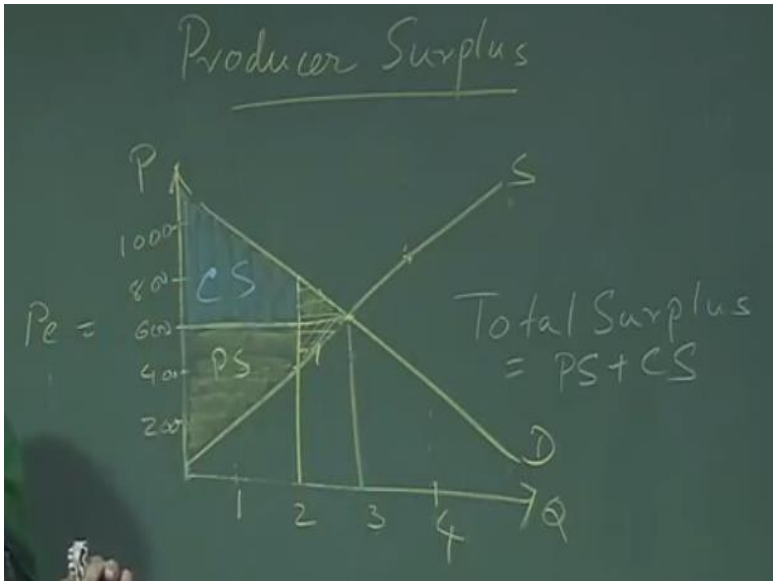

Say for example if it is decided that due to whatever reason that instead of 3 units 2 units will be produced and so the so if 2 units are produced what happens is the suppliers would the suppliers would be charging a smaller price and the demand so and the buyers would be the buyer since they are getting less than what was available in the market so the price goes up they would be willing to purchase more at a lower price and similarly the supplier see that it makes sense to increase the production in the market because they will be able to sell in the market so basically both of them move towards a so the producers basically start increasing they see that there is demand for the product in the market because the buyers are willing to pay a high price.

So obviously they start producing more to get a higher price so they move towards this equilibrium and similarly the consumers also do so and in both the situations and what happens to producer surplus and consumer surplus? What we see here is if they are producing if in the market the market is producing 2 units then the price the demand the producers the buyers are willing to pay is here and what and the amount of consumer surplus and producer surplus that is foregone is given by this area.

So in both the situations they see in this situation the producer see that it makes sense for them to keep on increasing a little increasing production a more little more to a greater higher price and they move towards this point so their producer surplus is enhanced and similarly consumers and as the production increases the consumers also the amount of availability in the market goes up and prices go down and more and more buyers enter the market so the consumer surplus also

goes up by this amount. Similarly the opposite is going to happen if the quantity somehow the production is say at here 4.

So if the production is here there is too much of supply at a high price and there is and the price that the buyers are willing to pay is low. So here again the same thing happens and they move towards this point and obviously since here the supply is here the looking at the producer surplus and consumer surplus point of view here the price the quantity is high and here the price is that the supplier would like to charge is at this point and there is there are no takers for this at this price.

So obviously they are going to reduce their the production and come back to a lower price. They are going to come back to a lower price and hence and hence producer surplus gets maximized over here. So here the supply when the at these points the cost is too high for the supplier and for the buyer the willingness to pay that is the price that they are willing to pay is much lower than the cost of the suppliers. So they here there is no region where there can be any producer surplus or consumer surplus. So basically this is the region where total surplus is maximized and market equilibrium hence actually is the most efficient outcome.

In the following classes we are going to discuss the different policies of the government that we already discussed in the context of this efficiency. We are going to see what happens to producer surplus, consumer surplus etc. when there is a regulation of price when there is price regulation what happens to producer surplus, consumer surplus, or efficiency in the market. Thank you.