Environmental & Resource Economics
Professor Sabuj Kumar Mandal
Department of Humanities and Social Sciences
Indian Institute of Technology, Madras
Lecture 19
Market Failure and Coase Theorem Part - 2

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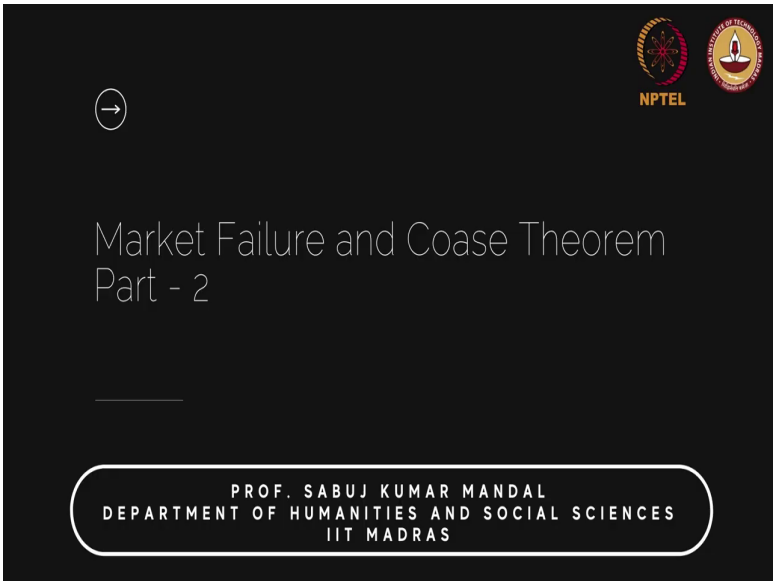

So, welcome to the environmental economics once again. What we will do today, we will discuss about market failure. Because in our previous class, so far, whatever the module we discussed those are mostly macro modules, that means, the issues are dealt at the macro level.

And if you recall, in our last class we are talking about the impact of regulation on firm's competitiveness. That means, the, we said the regulation is something, which is externally imposed on the firms since they are not able to internalize the externalities. They were making pollution, but there was no automatic correction mechanism for controlling pollution, and that is why regulation is required.

But at the micro level what is required to understand is, at the first hand, what is market failure? That means, the regulation is required when market cannot solve the problem. So, this is a situation of market failure.

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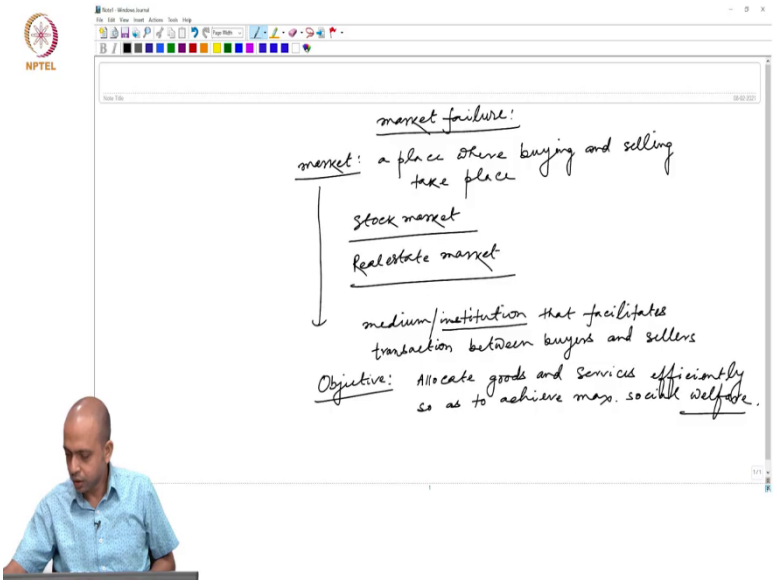

That is why at the micro level the first module of our discussion is market failure. Now, two things we need to understand. First of all, what is market? Once we understand market, then we need to understand what is market's objective. Because unless we know what is market's objective it is difficult to understand market failure. It is very simple. Logically, if you think, if we do not know somebody's objective then we cannot also understand why somebody is failed in that. So, failure is nothing but failure in achieving the objective, that is very simple. That is why we will first discuss about market, and then we will try to understand what is market's objective.

So, when you market, so you can take a minute or so and think about what exactly is market. And probably if you think the idea of market that comes first to your mind is market is basically a place, where buying and selling take place. This is the definition, it is a place, where consumers and suppliers they will come, buyers and sellers will come, and somebody will buy, somebody will sell, and that is how we define that place as market. This is the first impression, idea of market that comes to your mind. But this particular definition of market is a very, very narrow definition of market, and we need to have a broader understanding of market. And we will understand market is basically as an institution.

Now, what is the problem with this definition? Why I am saying that this is a very narrow definition? Because it is not necessary that market has to be confined in a place. For example, for most of the goods and services you can see a market. For example, fish market, potato

market, tomato market, market for paddy, market for computers, market for pen, market for shirts, trousers, water, so on and so forth. But there are some markets for which you do not have basically a place.

For example, when I am talking about stock market. Stock market, is there any place where sellers of stocks they are selling different stocks and you will go and pick up one or two stocks. Let us say, I want to buy a stock of Reliance, I want to buy a stock of ACC Cement or I want to buy a stock of, let us say ICT. So, do you think that all these people this ICT, Reliance, so on and so forth, all these companies will come to a place and they will sell their stocks? No.

So, these transaction happens virtually. So, you can even sit in US and invest your money in Indian stock market. Similarly, I can sit in India and invest my money in the US stock market or Chinese stock market, so on and so forth. So, that means, for this market, there is no place actually. The entire world is the under the coverage of this market. So, place is not required for this market.

Similarly, when you talk about real estate market, is there any market? no. That all the sellers, they will come with their 2 BHK or 3 BHK, 4 BHK apartments and you have to simply go there and pick one apartment and put it in your place, no.

So, for this market also, even the virtual transaction, virtually also you can see the product and you can invest here. So, and with online now, business taking place. So, the coverage of market is extending like anything. It is not simply confined in only a particular place. So, defining market or understanding market by a place is becoming very, very narrow concept of market mechanism. That is why from here onwards what we will understand market, as an institution or medium or exchange institution. A medium or institution that facilitates transaction between buyers and sellers. This is the definition.

Now, medium we can understand because the exchange happens through this market mechanism. But why the market is called institution? Initially if you recall, we said that economy comprises of three elements, economic agents, then buy institution at that point of time we mean government, because government is nothing but a set of rule. And we said that market actually interplays between the institution like government and economic agents. But some economists they say that market is also an institution because market is also nothing but

a set of rules. Different type of market has different set of rules depending on how the buyers and sellers are behaving.

For example, we have competitive market, we have monopoly market, we have monopolistically competitive market, we have oligopoly market, all those things you might have studied in your Principles of Economics or micro economics. And the rules actually differ from one market mechanism to another, but it is a set of rule about the behavior of the buyer and seller. That is why we say that market is also an institution, an exchange mechanism that facilitates transaction between buyers and sellers.

And next thing is, what is market's objective? The objective of market is to allocate goods and services efficiently so as to achieve maximum social welfare.

Now, what do we understand by efficient allocation of resources? To understand that, we will represent the market mechanism using the simple demand and supply diagram. Is that fine? So, for the time being you keep in mind that market's objective is to allocate goods and services efficiently, so as to achieve maximum social welfare.

So, in absence of market then what we would have required? An omnipotent social planner, a social planner who will understand. Because the society want n number of goods and services but resources limited. So, that means, society has to decide what goods or services to produce then how much to produce, and who will buy them. These are the three important things that a social planner would have decided in absence of market.

But market is actually doing that objective, and there is no need of a social planner. If there is no market and social planner has to take the decision you can understand, how difficult it would have been for the social planner. Because in our society, there are n number of people with heterogeneity in their preferences. So, social planner has to go and ask each and every individual what do you want.

If the social planner asks me, I will say that, I require a shirt, then next person wants an apple, next person wants a computer. So, social planner has to ask all these people what they want. Then how the social planner will summarize, whether to produce shirt or apple or a computer so on and so forth. Then social planner also has to identify who will produce them.

Somebody has to produce, somebody wants to produce computer, but there is no producer for apple.

So, you can understand the difficulty, how difficult it would have been for the social planner to decide what goods to produce, how much to produce, who will buy them and all these objectives are efficiently costlessly satisfied by the market mechanism. So, by efficient allocation of resources, what we mean is the following. So, we will now understand, how does the market operate this.

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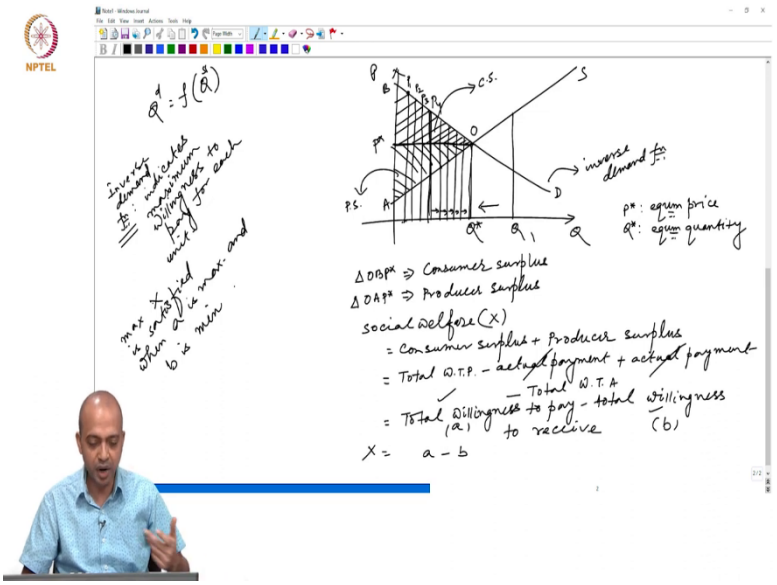

So, let us say that, this is a simple demand and supply curve. This is the demand curve, this is the supply curve. This is demand and this is supply. Now, demand, if you understand demand is basically a function of output, demand is a function of output. If that is the case, then the quantity demand would have been presented in the X axis, sorry, Y axis and this price would have been presented in the X axis, but instead of that, we are doing the opposite. That means, the demand what we have drawn here is called an inverse demand function.

And this inverse demand function it has a different meaning. What is the meaning? The meaning is that, since we have presented price on the Y axis. So, let us say that this quantity demand is divisible into small, small unit. Let us say that this is the first unit that the consumer is buying.

So, the first, for the first unit the consumer is actually willing to pay this much, but what actually the consumer is paying that is different actually. Similarly, for the second unit this

much is the quantity. So, that means, the demand function actually indicates maximum willingness to pay for each unit. That is the interpretation of this inverse demand function. It indicates maximum willingness to pay for each unit right.

Then, if you look at since the demand function is downward sloping, maximum willingness to pay is coming down for every successive units. Why this is so? This is so, because of diminishing marginal utility. If you consume more and more of a commodity then additional utility that you are getting from this extra unit that is coming down that is why it is downward sloping.

But interestingly, even though, for the first unit the maximum willingness to pay is P1, for the second one is P2, third one is P3, the consumer is actually paying for all these units only P star, this is the equilibrium price, P star and Q star. So, Q star is the equilibrium quantity and P star is what we say, equilibrium price and Q star is equilibrium quantity. So, this is called equilibrium.

Why this is called equilibrium? Because if you take any price, any quantity beyond this Q star. Let us say I am taking this, let us say Q1 or let us say this is the price, which is P4. So, at P4, you can understand at P4, the consumer's willingness to pay is more than, the interpretation of the inverse demand function is the maximum willingness to pay. Similarly, what is the interpretation of the supply curve? If you apply the same analogy, then supply curve is nothing but what is the minimum price the supplier wants to receive to supply that quantity.

So, at P4, what we can understand that the consumer's willingness to pay is much more than what the supplier wants to receive. So, then supplier will supply more, and it will come to this situation Q star. At Q star, the consumer's willingness to pay and supplier's minimum willingness to receive is equal.

Similarly, at Q1 what is happening, the supplier's minimum price the supplier wants to receive is much more than what the consumer wants to pay. So, that means, consumer is assigning less value to the product than what the supplier wants to receive. So, obviously production will fall and ultimately they will reach at Q star. That is why, at Q star, what is happening here the social welfare is maximum.

Why this is so? Because if you give different names let us say this is O, this is A and let us say this is B. So this, what is this OBP star indicates, OBP star. This area I am talking about. This area. See, for each and every unit the consumer's willingness to pay is more than what he is actually paying, so that means the consumer is actually maintaining some amount of surplus. That is why, the entire triangle is known as consumer surplus.

Similarly, what is the triangle OAP star indicates? For each and every unit, what the supplier wants to receive is much lower than what he is actually getting. So, that means, for each and every unit supplier is maintaining some kind of surplus. So, that means, this is called producer surplus.

And if we assume, that in a society there are only two individual, one is supplier producer and another one is consumer, then if we add these to that is nothing but the social welfare. So, the social welfare then, social welfare is equals to consumer surplus plus producer surplus. Now, what is consumer surplus then? The total willingness to pay minus actual payment.

Total willingness to pay or WTP minus actual payment. What is producer surplus. The actual payment minus total willingness to accept. So, this will get canceled. So, that means, ultimately, willingness to pay minus willingness to total willingness to pay minus total willingness to receive you can think of.

So, that means, social welfare is maximum when this is maximum and this is minimum. Let us say this is A and this is B. What the consumers wants to pay in total, their willingness to pay that is denoted by E, and what the supplier wants to receive the total to supply Q star amount is denoted by A. So, this is nothing but A minus B. So, social welfare, let us say that is denoted by X, that means, X equals to A minus B.

Now, maximization of X is satisfied when A is maximum and B is minimum, very simple. Now, let us see at equilibrium what is happening. See, for each and every individual at equilibrium, equilibrium price is actually P star. So, if somebody's willingness to pay for a quantity is less than P star then that buyer cannot buy the product, is very simple. Market price is P star, and somebody's willingness to pay is less than P star.

So, anyone's, all those buyers, all those buyers whose willingness to pay is less than P star will simply exit from the market. That is why we can ensure that at equilibrium consumer

surplus is actually maximum. Because it comprises of those customers only whose willingness to pay is more than this quoted price.

Similarly, if a supplier's production cost is more than P star, then that supplier would have exited from the market, because that is not profitable. Market price is P star and my cost of production for the unit is more than P star, how can I survive? So, all those producers, whose cost of production is more than P star, they also would have exited from the market.

So, that means, at equilibrium only those suppliers are there in the market whose cost of production is lower than P star. That is why the total willingness to receive is also minimum.