Petroleum Economics and Management
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Module - 02
Basics of Microeconomics
Lecture - 07
Determinants of demand

Hi everyone. I am Dr. Anwesha Aditya Assistant Professor in the Department of Humanities and Social Sciences of IIT, Kharagpur. I am your instructor for the course Petroleum Economics and Management. We have already outlined our syllabus of the course we have discuss the relevance of having a course on petroleum economics and management.

So, as we already discussed that there is no prerequisite for the course. So, anyone who is interested in the global oil market and its implication can join the course. Therefore, we need to have some basic understanding of the very basic introductory issues of economics. Hence in our second module we are discussing some elementary concepts in economics.

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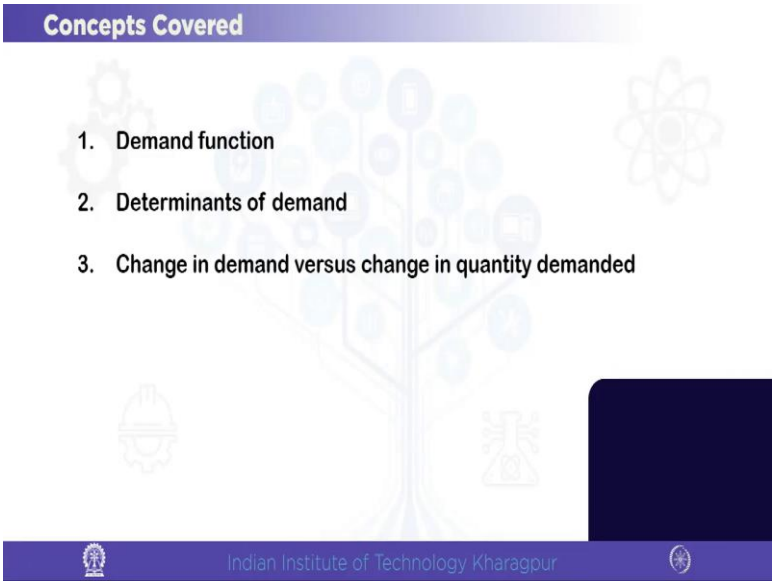

In today's lecture of module 2, lecture 7 we are going to discuss the issue of analysis of demand in detail. So, if you just remember one of the major part of our syllabus is

regarding the movement of oil price, the analysis of the global oil market. Therefore, we need to know in detail about the market. Means what do we mean by market how the outcomes like price and quantity are decided in a market.

So, we already studied that by market we do not refer to a particular geographical location or any particular online portal. So, by market we mean that in a market there are two parties, but they need not meet each other. So, but we need to have two parties in a market the buyer side and the seller side.

So, we will be studying these two sides separately and then we will be putting the two together to find out the market price and the equilibrium quantities transacted. So, first we start with the demand side of the market. So, we already discussed about what do we mean by demand and we derived the demand function, we discussed about the very important law of demand.

Now, in today's class we will elaborate more on this and we will proceed further. So, what are the topics that I am going to cover in today's class? So, we will just briefly recapitulate about the demand function and then we will be discussing about what are the factors on which quantity demanded of a good depends on.

And then what happens when these factors change. For example, so because we have to analyze the impact of the major happenings in the world or market in the world economy on the petroleum prices. For example, the COVID-19 lockdown. So, what happens when the lockdown is imposed? So, what happens to the oil price? So, what happens to the quantity transacted? What happens when the Russia Ukraine war emerges?

So, we need to know the impact of these events on the world oil market. That is why we need to analyze the impact of different events on demand and supply separately and then we will discuss what will happen to the equilibrium price and quantity.

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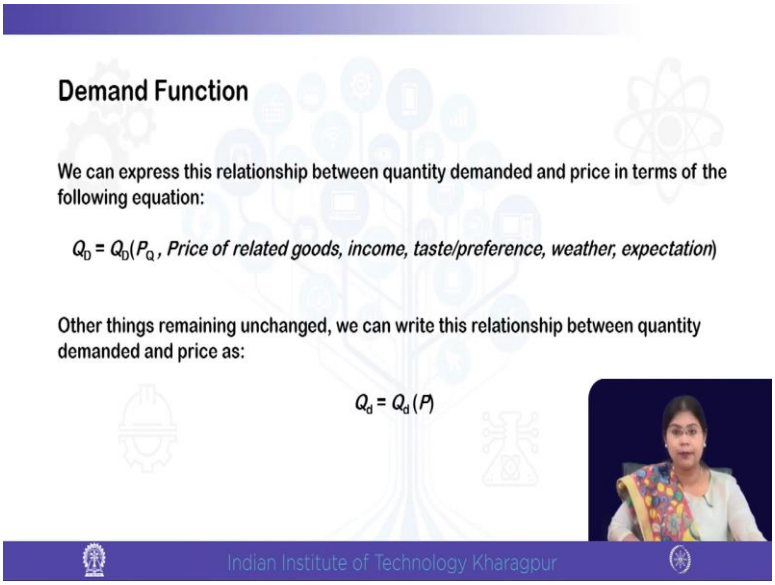

So, with this I start today's lecture. So, just a recapitulation that by demand in economics we mean demand should be backed by purchasing power is just not the willingness to buy, but the consumer should be able to afford to pay for the good or service. And if you remember. So, we are talking about representative consumer so far. Later as we proceeded further, we will be adding up the consumers and then we will be deriving the market demand. Therefore, what are the factors on which quantity demanded depends?

So, first and foremost as we discussed already quantity demanded of a particular good depends on its own price. Now other things remaining unchanged quantity demanded as a function of price is called the demand function. We have already discussed it and if you remember we have plotted the demand function like this and we also discuss that we do not plot the direct demand function.

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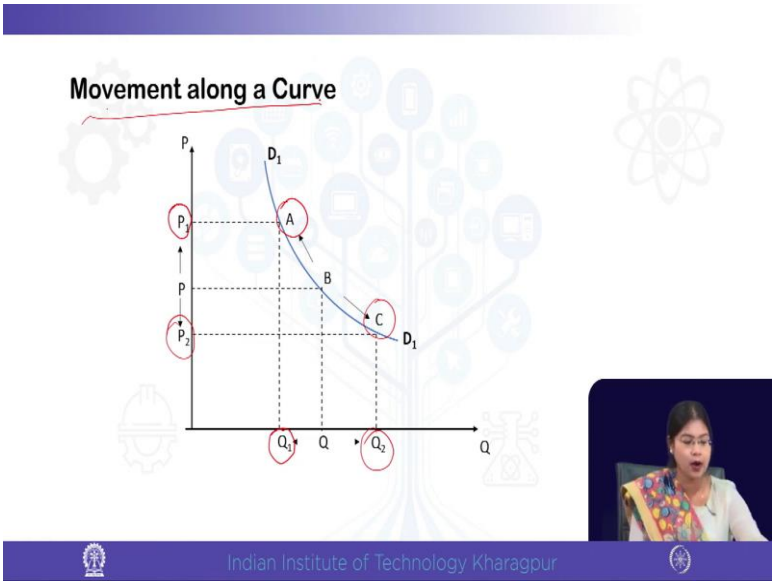

So, quantity demanded as a function of price is called the direct demand function, ok. And the negative slope of this demand curve D_1D_1 follows from the fact that quantity demanded and price these are inversely related. Because empirically, we see that for most of the products as price increases quantity demanded falls given other things unchanged.

So, that is how we get the demand curve. But what we are plotting over here is not the direct demand function, but we are plotting the inverse form of the demand function. That is demand price should be a function of the quantity that the consumer is able to and willing to buy, ok. So, we are representing P_D as a function of x. P_D is the demand price or the maximum willingness to pay price which is a function of quantity demanded

So, we already discussed in detail that it was due to Alfred Marshall who viewed the entire analysis from the seller's point of view. So, we always plot price on the vertical axis and quantity demanded on the horizontal axis. So, this is the interpretation of the inverse form of the demand function.

So, henceforth we will be working graphically with the inverse form of the demand function.

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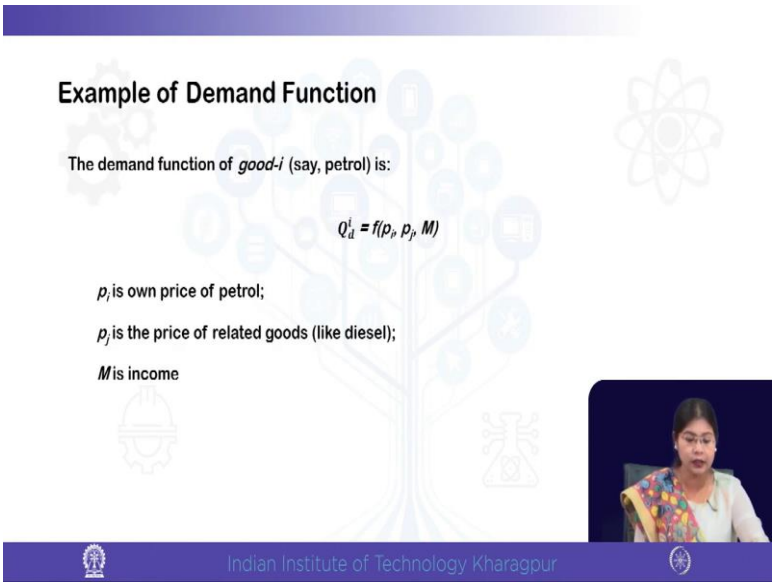

Now, I am saying repeatedly as you can hear that other things remaining unchanged, quantity demanded is a function of price.

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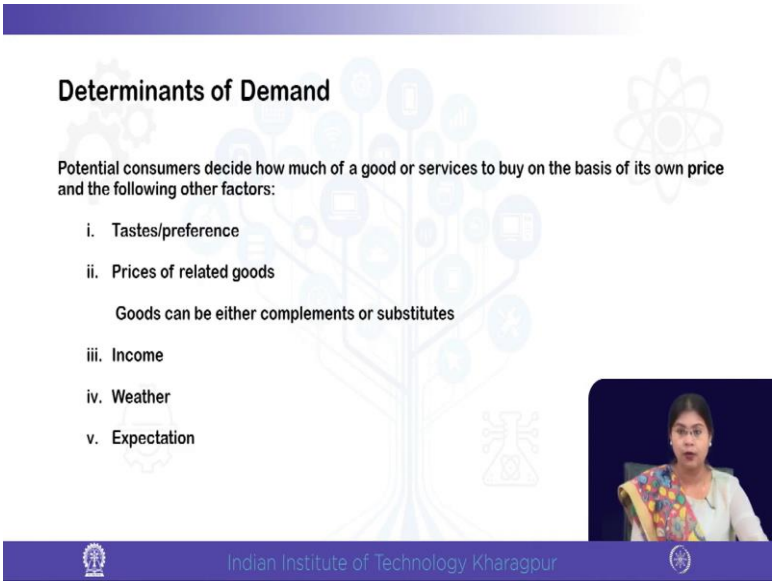

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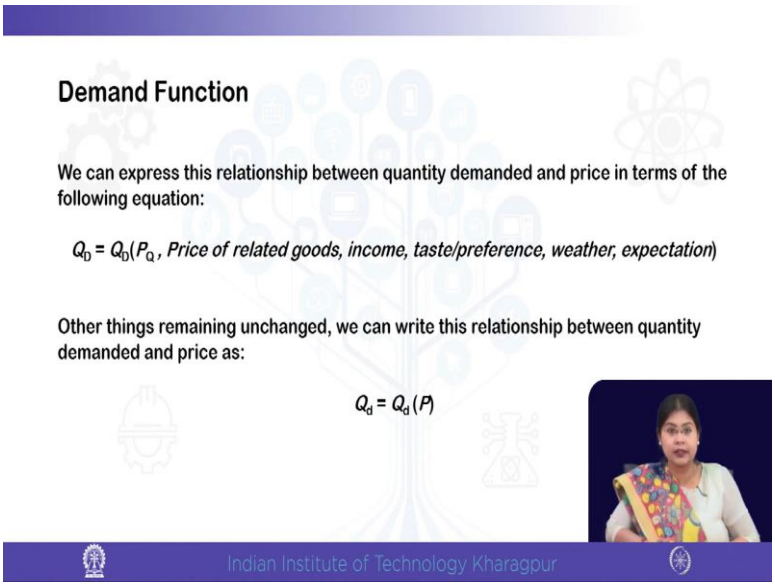

So, what do we mean when I am saying other things. So, what are the other things? Now in today's class we will be discussing in detail about these other things, ok. What are the factors on which quantity demanded depends apart from its own price? And then we will be subsequently discussing the impact of changes in these factors one by one on the quantity demanded.

So, first and foremost see quantity demanded of a good depends on what our taste or preference? If we do not like a good even if price falls. So, we may not be buying more.

For example, we can consider the choice between the print media and the electronic media or reading hard copy and soft copy.

Nowadays more or less people are more acquainted the younger generation is more acquainted with the soft copies online resources rather than reading hard copies. But there are many also who find hard copy more comfortable to read and understand and comprehends, right.

So, this is a choice individual choice. So, taste and preference is very important determinant of demand. If you do not like it even if price falls you will not buy that. Suppose price of tea falls, but if someone likes coffee only does not like tea that person will not buy even if the price of coffee is falling that person will not buy coffee.

So, taste and preference is the first and foremost determinant of demand apart from price of the own commodity the commodity itself. Second is price of related good. So, what do we mean by price of related good? So, quantity demanded of a particular good depends not only its own price, but also price of other related good.

Now, see there can be two types of relation between the two goods. But first some goods can be consumed together. For example, these are called the perfect complements like tea and sugar or say petrol driven automobile and petroleum, right? So, these are consumed together petrol driven automobile and petrol. So, these are called complements.

And what are the substitutes? Substitutes are the one which one can replace the other. For example, we are just taking the example of coffee and tea these are substitutes, right. Similarly, petrol and diesel these are substitutes of one another. So, price, but the quantity demanded will depend on not only its own price, but also price of other goods.

So, see here we are writing that quantity demanded it is a function of own price P_Q because we are writing the good as Q this is often the standard notation. So, as mentioned in the earlier lecture that we will be using either Q or x to denote quantity. So, Q_D as a function of P_Q, P_Q means price of good Q, ok.

So, but it is also a function of taste and preference and also it is a function of price of related good like say j^{th} good, ok. So, there are two types of goods complements and

substitutes. So, what will happen if suppose price of petrol falls? So, what will happen to the demand for petrol driven car? We will show it graphically we will explain well.

So, these two are example of complements. And what will happen if price of diesel falls or how the demand for petrol driven curve will change? Ok. These are the examples of substitutes. So, because petrol and diesel are substitutes, ok. So, we will be discussing all these things with examples and how graphically the demand curve will change or it will move along the same demand curve we will discuss everything in detail. We are just now discussing what are the factors on which demand depends on.

The third very important determinant of demand is of course, income. Can we buy everything whatever we want even if we like that good, we prefer that good we prefer it in more quantity, but we are subject to affordability or our budget constraint we are often constrained by our budget, is not it?

However rich a person may be the budget constraint may be relaxed, but we do not have unconstrained budget or unconstrained income. We have a limited income it can be wage income or it can be endowment income, but there must be some upper limit on income. Therefore, whatever we want to buy even if we prefer that ok, but we may not be able to buy everything we want because we are constrained by income.

So, income is a very important determinant of demand. So, if income increases then for most of the good demand will increase, but may not be to the same extent that also will quantify in the subsequent lectures when we will be studying the concept of elasticity. So, if income increases how much quantity demanded will in change.

For example, if your parents double your pocket money, are you going to buy double the quantity of consumption of say medicine? No. If our income increases, if our salary increases, we are not going to spend more on medicine, we will just have medicine that much amount which is prescribed by the doctor.

But we can buy more of other products electronic products, new laptop, new cell phone or accessories, dress material, shoes, garments, right? So, income is a major determinant of quantity demanded. Similarly, if income falls for most of the good quantity demanded will fall.

There may be some exceptions also which we will discuss what are the goods for which if income falls quantity demanded can increase also or if income increases quantity demanded falls. So, we will go into those detail. What is the 4th factor on which quantity demanded depends? That is weather.

So, we know often we have seasonality in our demand. For example, in the rainy season we have to buy umbrella, raincoat. During the summer the demand for electronic goods like air condition, air cooler, ceiling fan increases ice cream, soft drinks all the demand for these goods will increase. In the winter the demand for woolen garments increase or room heater increase. So, weather is a very important determinant of demand.

So, depending on the season of the year. So, different types of products are bought and sold in the market they are made available in a larger quantity. So, we already discussed in the last class that income is not enough just to enable us to buy the good or service the good or service should be available in the market.

So, weather is a very important factor in demand. Lastly its expectation because if we expect that price of some good will change in near future. For example, so in economics expectation plays a very important role. Suppose we expect that may be after the budget some taxes can be reduced. So, say for example, I am just taking a hypothetical example if one expects that after the budget the GST on some products will be reduced.

So, a person can postpone the purchase can expect that I will make the purchase after the new tax rates are announced or someone can also expect the other way round that price may go up. So, with this expectation one can also prepone the purchase decision. So, expectation is very important. Expectation about the changing market condition, expectation about the price movement in future can induce the person to prepone or postpone the purchase plan.

Therefore, these are the major determinants of demand apart from own price. Therefore, we can write right the quantity demand as a function of its own price as you can see Q_D is a function of P_Q price of related good income taste or preference weather expectation. Now, we keep all other factors apart from own price unchanged and then Q_D is represented as a function of price only.

So, this is called the demand function. So, when we are deriving the demand function, we are just plotting price against quantity and we are holding the other things unchanged. So, the demand function is the relationship between quantity demanded for different prices or in the inverse form it is the relationship between the maximum willingness to pay prices and the different quantities that the consumer would like to buy, ok.

So, other things are remaining unchanged. So, that means, if other things remaining unchanged. So, for a given income there is suppose no seasonality also in the demand, there is no change in taste or preference of the consumer, there is no change in price of related good, there is no expectation also regarding the future price. So, in that case what will happen if only price of a good changes quantity demanded will change along the particular demand function, ok.

As we can see for example, suppose initially we are at price is P_1 and the corresponding quantity is Q_1. So, at P_1 price we can see that the corresponding quantity is Q_1 and we are at point A in the demand function D_1D_1. Now suppose for some reason price falls from point P_1 to price falls to P_2.

So, if price falls from P_1 to P_2 with other things remaining unchanged by law of demand, we know that at a lower price quantity demanded increases from Q_1 to Q_2. So, we move down along the same demand curve D_1D_1 from point A to C, ok. So, this is called movement along a curve; that means, we are moving along a particular demand curve with change in own price only.

There is no change in other determinants of demand this is called change in quantity demanded ok, see. So, change in quantity demanded the second point over here you see its a movement along the demand curve due to change in own price only other things remaining unchanged, ok. Now what will happen if these other things do not remain unchanged which is more realistic?

Because in reality due to lot of external events also these other things will often change, income will not remain constant, there will be change in expectation due to the market scenario due to war or natural calamity, there will be change in taste or preference new products are often introduced in the market in todays globalized world we know that new electronic products new varieties are launched each and every day new products are being imported from different countries with new features.

So, taste and preference will change. People may want to change their update their laptop or smart phone. So, what will happen if these factors other than own price change? How demand will change?

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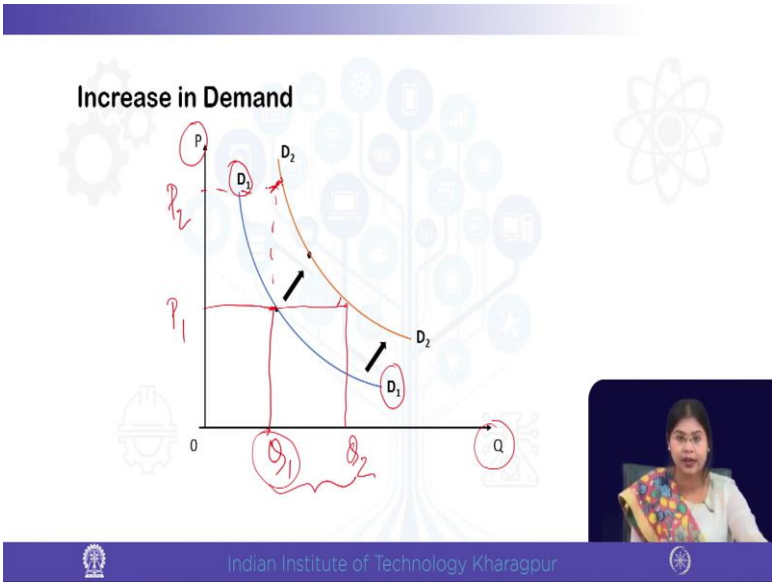

So, let us see let us take the very simple example of a so price increase. Suppose, initially for a given price the demand function is D_1D_1 as you can see in this figure. Of course, we are plotting the inverse demand function where price is on the vertical axis and the quantity is on the horizontal axis.

So, suppose initially we have this coordinate point at price P_1 the quantity demanded is Q_1. So, at a given price suppose income of the consumer increases. So, what will happen? For most of the good if income increases our purchasing ability our affordability will increase.

So, we want to buy most of the goods in more quantity. So, with income increase since our budget constraint is bit relaxed. So, we can afford to pay for larger amount of that good, ok. So, what will happen at price P_1 the consumer may be willing to buy a larger quantity Q_2, ok. You do not need the price to fall to be able to for the consumer to buy the larger quantity just at a given price the consumer should be able to buy more if income increases, right.

So, in this way for different prices we can see that the consumer will be willing to buy more if income increases. Now; obviously, the extent will not be the same this Q_1, Q_2 not be the same for all types of goods or services like I was taking the example of medicine. If income increases say income doubles. How many will double the consumption of medicine? No, because we will take prescribed amount of medicine, right.

So, we will discuss that how this magnitude on which factor this magnitude of change in quantity demanded will depend if these other factors , determinants of demand will change that we will discuss in subsequent lecture. In today's class just let us see what happens to this demand curve D_1D_1 if income of the consumer changes other things remaining unchanged.

So, just let me just reiterate. When we are analyzing the impact of income change, we are keeping constant all other factors. Like we are also assuming that taste preference or expectation or price of related good are not changing. Of course, in reality these things can change together, but for our understanding for simplicity of explanation we are just changing one factor at a time.

So, if income increases then for any price the consumer is willing to buy more. Therefore, we get a new demand curve D_2D_2. Therefore, what happens the entire demand curve shifts in the post income change scenario or to be more specific income increase scenario no longer we have the initial demand curve D_1D_1 the new demand curve is D_2D_2.

We can also interpret it from the inverse point of view. What happens? From the inverse point of view initially with unchanged income with the initial income at quantity Q_1 the maximum willingness to pay price was P_1. Now, if income increases. So, by the inverse form of the demand function how should they interpret?

Now, to buy the same quantity the consumer is willing to pay more. So, the consumer is willing to pay a high price than P_1 to buy the same quantity Q_1. Suppose, the consumer now wants to pay this high price P_2, then also you see we are on the new demand curve D_2D_2.

So, this way also from the inverse point of view or from the Marshallian point of view also we can explain the shift of the demand curve when the income is increasing.

Therefore, this is called this the impact of change in income is called the shift of the demand curve because we are getting a new demand curve the entire the initial demand curve D_1D_1 no longer is relevant.

So, this is called change in demand. Here in this case in demand has increased, but demand can fall also. So, we can change the example we can think of fall in income in that case the demand curve will shift in. So, this is what happens when something other than own price changes. So, we get a new demand curve. So, this is called the shift of the demand curve or this is also known as change in demand.

So, we have now two related concepts, but different change in demand versus change in quantity demanded. So, change in demand happens when something other than own-price changes like in the example, we so far income has changed. So, if income changes we get a new demand curve. So, the demand curve shifts this is called change in demand this is in contrast to change in quantity demanded where other things were unchanged only own price changed.

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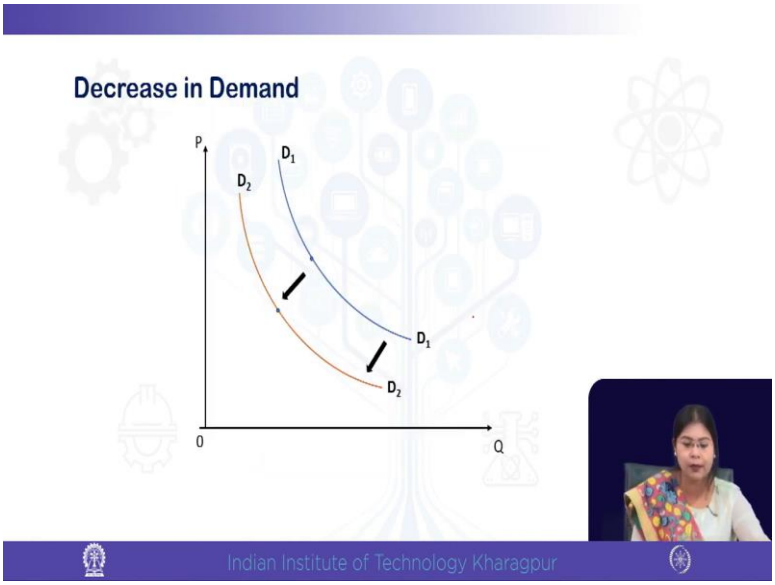

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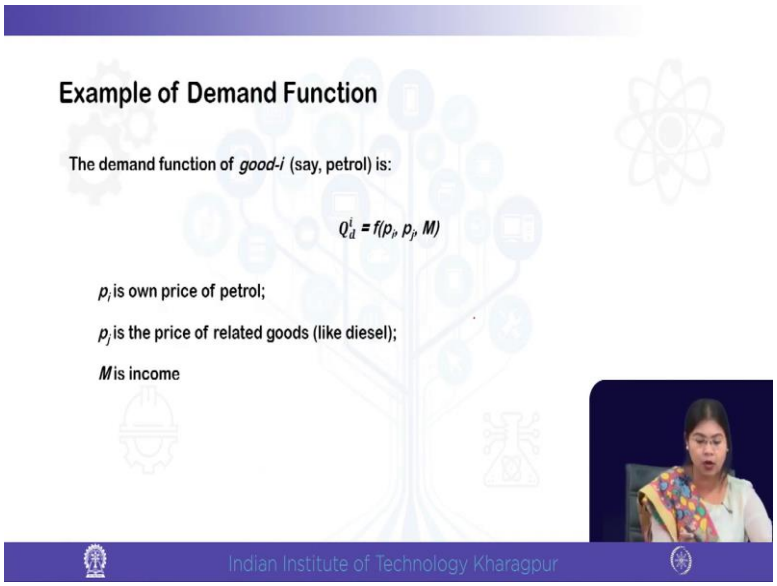

So, we moved along the same demand curve we can also take other examples of change in the demand curve or the shift of the demand curve like I was telling these examples of quantity demanded of suppose petrol. Suppose we write down the demand function for petrol. So, quantity demanded of petrol it depends on price of petrol Q_d^i quantity demanded of petrol i is the petrol and it is a function of its own price.

So, p_i is own price of petrol. And p_j is what? p_j is the price of related good like diesel then M is the income, ok. So, what happens if price of suppose diesel falls? If price of

diesel falls then people would like to buy more of the cheaper good. So, demand for petrol will then fall, ok. So, we can think of several examples. And you can now correlate how the COVID-19 pandemic affected the world demand for oil, what happened we already discussed that a major demand for oil comes from the transportation.

In the energy sector from mid-1980s onward we gradually started replacing oil. But transportation till now heavily depends on oil. We have already discussed the advantage of oil as a major mode of transport means the source of energy for mode of transport because oil is fluid it can be stored easily, transported easily, the energy to weight ratio is high.

So, for travel over long distances oil is much better than compared to other solid sources of energy like coal. Therefore, oil has replaced all other sources of energy to become the major source of energy for transportation and that is why during the pandemic just at the beginning of the pandemic when the countries around the globe they responded with lot of restrictions travel restrictions, restriction in the movement of people.

So, what happened there was a drastic fall in demand for oil which mainly came from transportation sector. And that led to this demand curve for oil if we plot. So, the demand curve for oil and after the lockdown imposition and the travel restriction. So, how we can say, this lockdown has led to reduction in the demand for oil because transportation was halted. So, that is why you see we need to discuss these basic issues of economics to understand the happenings in the global oil market.

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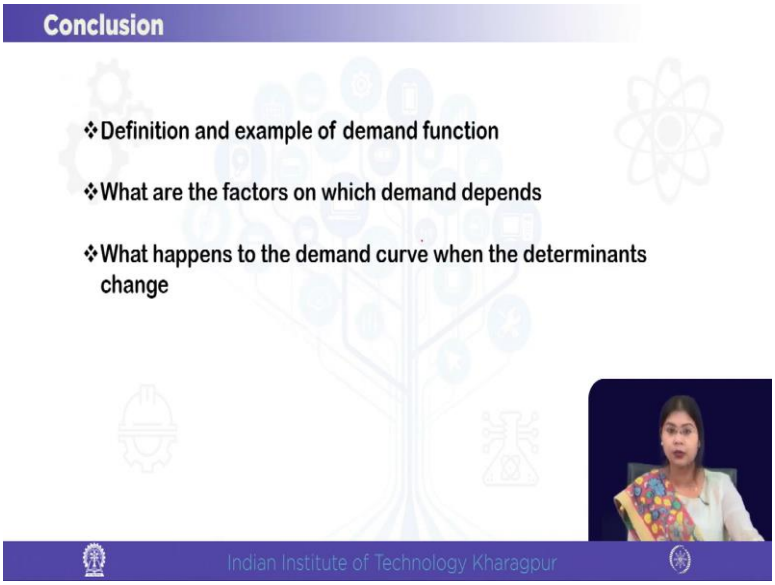

So, just to summarize the today's class we took the examples and definitions of the demand function, we recapitulate with the direct demand function and indirect demand function and we saw that quantity demanded is not only a function of its own price, but we discussed what are the other factors on which demand depends.

So, we found that price of related good, income, taste and preference with our expectation these factors also play very important role in determining demand of a good by a particular consumer. So, till now we are studying a representative consumer later of course, we will be moving to the aggregate for all the consumers, ok.

Then we also analyzed what happens when this determinants of demand change. So, we analyze that if only own price changes other things remaining unchanged. So, we move along a particular demand function. Then we also discussed what happens if own price is unchanged, but something other than own price changes. So, what will happen to the demand. So, we saw that with own price change we move along a demand curve that is called change in quantity demanded.

But if something other than own price changes we get a new demand curve and that is called a shift of demand or change in demand. So, we distinguish between these two concepts of change in quantity demanded which is caused by change in own price and change in demand which is caused by something other than own price.

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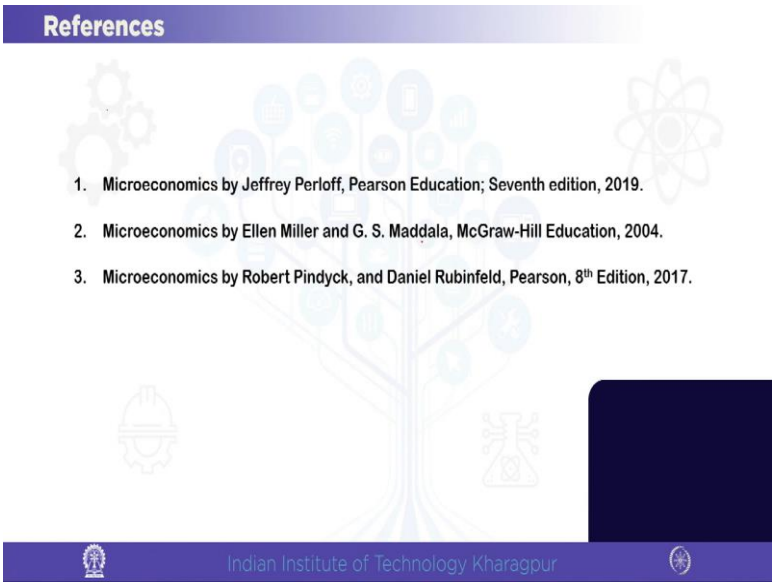

So, in the next classes we will be discussing to the other side of the market will be going to the other side of the market that is the supplier side. And these are the main books we have followed, but one can follow any standard microeconomics related book.

Thank you.