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Lecture 03
Changes in Demand and Elasticity

So, an important aspect of understanding demand and market is to understand what factors influence demand and how that affects the working of the market. Instead, what are the factors that contribute to variations in demand? To understand these variations in demand, we use a very simple concept called elasticities.

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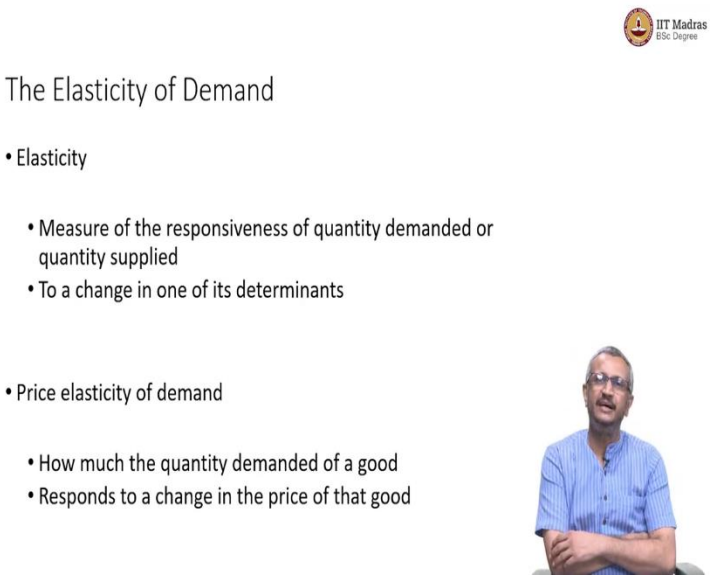

Now, elasticities can be used to measure the variations in demand. Now, what is elasticity? Elasticity is the measure of responsiveness of quantity demanded for quantity supplied. To what? To a change in one of its determinants. So, quantity demanded or quantity supplied responds to one of its determinants and that is elasticity.

Let us, take price elasticity of demand, which is very important in terms of understanding demand and markets. What do we mean by price elasticity of demand? By price elasticity of demand, we mean how much the quantity demanded of a good responds to a change in the price of that good. I repeat how much the quantity demanded of a good responds to a change in the price of a good.

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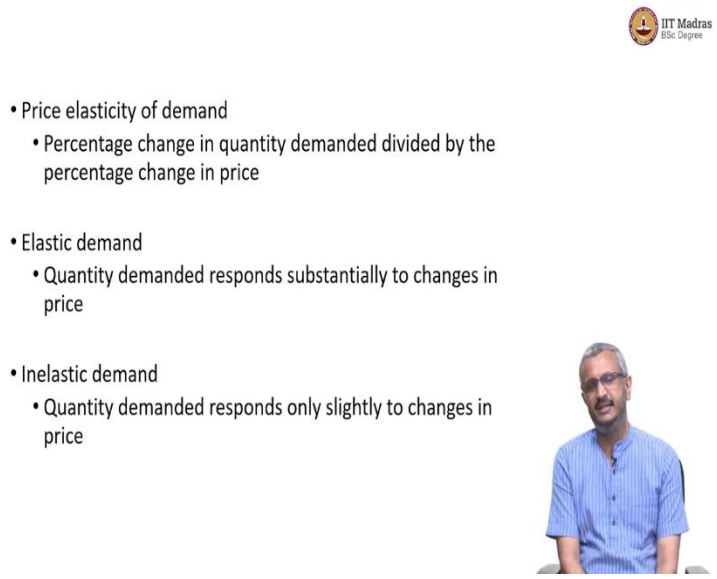

Now, price elasticity is nothing but percentage change in quantity demanded divided by percentage change in price.

$$\text{Price Elasticity} = \frac{\text{Percentage Change in Quantity Demanded}}{\text{Percentage Change in Price}}$$

And quantity demanded responds substantially to changes in price which we know from the law of demand or theory of demand. When price increases, quantity demand falls and when price falls, quantity demand increases.

So, we can have two situations of elastic demand and inelastic demand. The elastic demand is a situation where quantity demanded responds substantially to changes in price and inelastic demand is a situation where quantity demanded responds only slightly to changes in prices.

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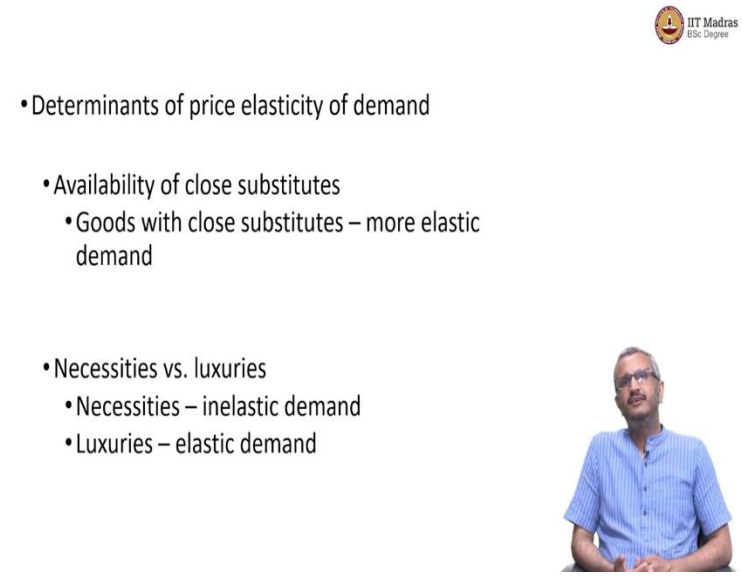

Now, what are the determinants of the price elasticity of demand? Well, one determinant is close substitutes. If I have a close substitute, then when the price of one commodity changes, I might substitute that with that close substitute. So availability of close substitutes is very important in assessing price elasticity of demand. That is goods with close substitutes are more elastic in demand.

The second important kind of concept that we need to keep in mind is, we can classify goods on the basis of these elasticities. For example necessities or commodities where the demand is inelastic. For example, medicine prices, unit prices of certain medicines are very high, we might consume that because it is a necessity for us.

Whereas for luxuries, we notice elastic demand because well when the price increases we can avoid that perhaps, so the consumption of luxuries can be postponed, we can wait. Whereas consumption of necessities we cannot postpone, which is why it is called a necessity. So, necessities are these commodities for which demand is inelastic, and luxuries are those commodities for which demand is elastic.

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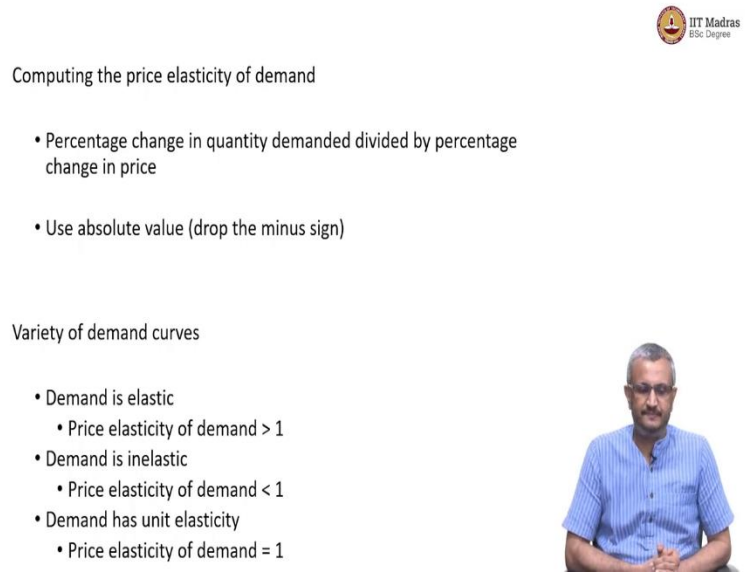

So, how do we compute this? Well, straightforward computation and compute what? Compute the price elasticity of demand. Price elasticity of demand is computed as a percentage change in quantity demanded divided by a percentage change in price.

And we use the absolute value because when the price increases, the quantity demanded actually decreases, so you might end up with a minus sign, so we dropped the minus sign, and we use the absolute value.

So, a very simple kind of computation, percentage change in quantity demanded divided by percentage change in price will give us the elasticity of demand. Now, then you get varieties of demand curves. When the demand is elastic what happens? Price elasticity of demand is greater than 1. When the demand is inelastic, price elasticity of demand is actually less than 1, and demand is unit elastic when price elasticity of demand is 1. Let me explain these concepts a little more.

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Variety of demand curves

- Demand is perfectly inelastic
  - Price elasticity of demand = 0
  - Demand curve is vertical
- Demand is perfectly elastic
  - Price elasticity of demand = infinity
  - Demand curve is horizontal

The flatter the demand curve

- The greater the price elasticity of demand
- But elasticity is NOT just the slope, but also the position on the curve

Computing the price elasticity of demand

- Percentage change in quantity demanded divided by percentage change in price
- Use absolute value (drop the minus sign)

Variety of demand curves

- Demand is elastic
  - Price elasticity of demand > 1
- Demand is inelastic
  - Price elasticity of demand < 1
- Demand has unit elasticity
  - Price elasticity of demand = 1

We can have situations where the demand is perfectly inelastic. We can have situations where price elasticity of demand is 0, when the demand curve is actually vertical. So, we have situations where perfectly inelastic demand curve, we have situations where perfectly elastic demand curve comes. So, when the price elasticity of demand is 0, when the demand curve is vertical, we say that demand is perfectly inelastic, medicines and things of that sort, whatever the price we will consume.

Demand is perfectly elastic when the price elasticity of demand is infinite, which means the demand curve is horizontal. For very small variation in price, we might not even buy it. So, the

flatter the demand curve, the greater the price elasticity of demand. But elasticity is not just the slope but also the position on the curve, which is very important. So, I will go back for a minute.

So, we have varieties of demand curves which we can see, earlier we saw only one kind of a demand curve, they are downward sloping, but within that we can find varieties of demand curve depending on how elastic the commodity is to changes in price. So, we have demand inelastic, unit elastic, then we have perfectly inelastic, and then we have perfectly elastic demand curve.

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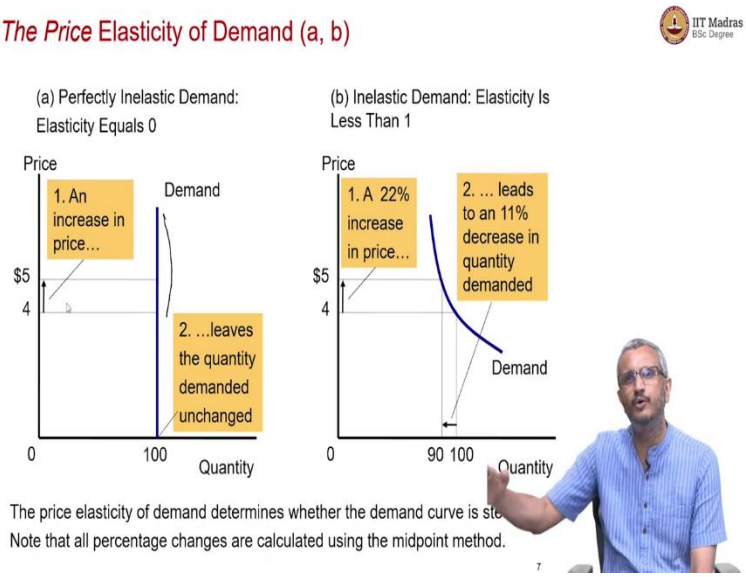

Now, let me put just one example for this. Here is a situation of a perfectly inelastic demand curve, in a perfectly inelastic demand curve, we find that well, the demand is perfectly elastic that is elasticity equals 0. What does that mean? It means that, when the price of a commodity is increasing, that is an increase in the price from 4 to 5 dollars leaves the quantity demanded unchanged. I am buying only that much, I am not going to buy more because the price has varied, or I am not going to buy less because the price has varied.

So, there is a perfectly inelastic demand curve. Now, elasticity is less than one is another example that I have put up, that is a 22 % increase in price leads to 11 % decrease in quantity demanded. So, price elasticity of demand, determines whether demand curve is steep or demand curve is flat.

Now, so here are two examples, perfectly inelastic demand, inelastic demand. Perfectly inelastic demand is when elasticity equals 0, that is when an increase in price leaves the quantity demanded unchanged. In the other example, we find that a 22 % increase in price leads to 11 % decrease in

the quantity demanded. So, one can have various examples like this, so we can have varieties of demand curve, not the only downward sloping kind of a demand curve.

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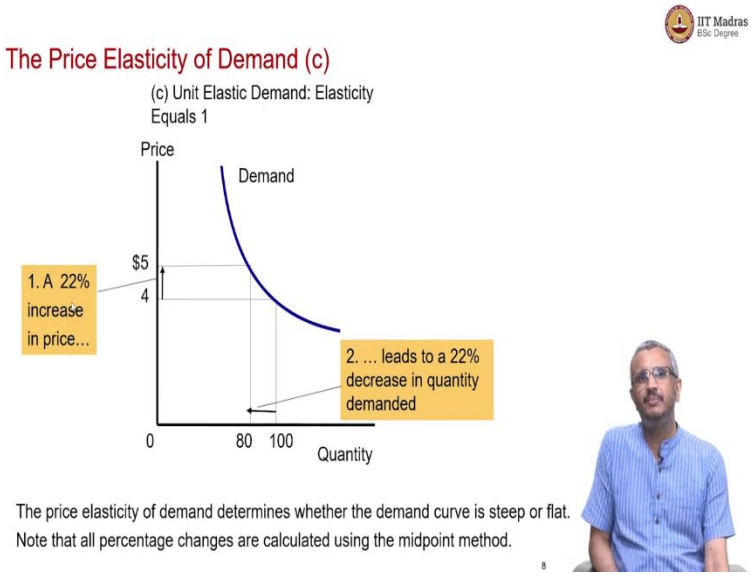

Now, here is a demand curve with unit elasticity of demand, a 22 % increase in price leads to a 22 % decrease in the quantity demanded in this example.

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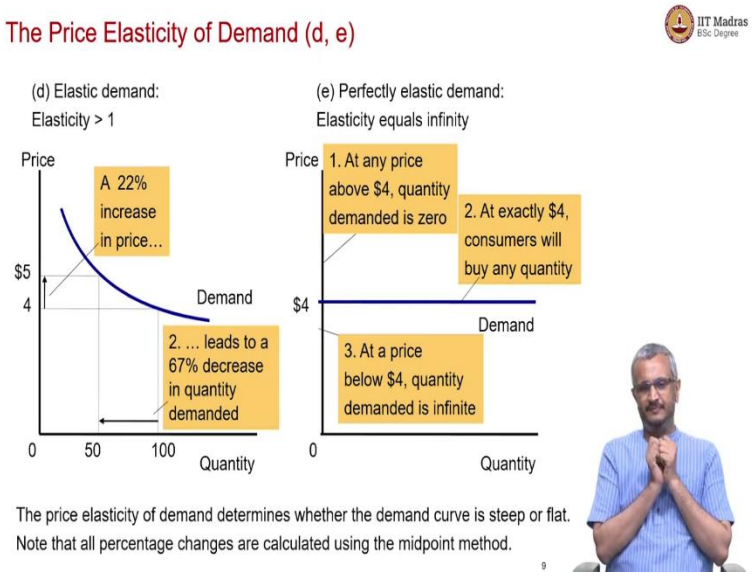

And here is another example where elasticity is actually greater than 1, which is 22 % increase in price, leading to a 67 % decrease in the quantity demanded. And finally, I show that there is perfectly inelastic demand, where I find that elasticity is perfectly elastic that is at any price above 4 dollars quantity demanded is 0, I will not buy that commodity at all. So, at exactly 4 dollars consumer buys any quantity, at a price below 4 dollars quantity demanded is infinite, and at any price above 4 dollars quantity demanded is 0, a perfectly elastic demand curve. So, let me just recap these kinds of demand curves once more.

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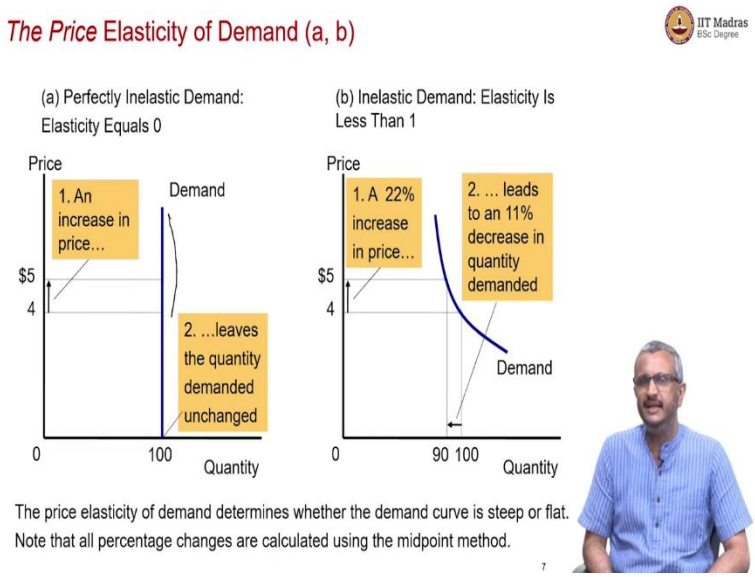

Here, perfectly inelastic demand, then inelastic demand, but elasticity is less than 1.

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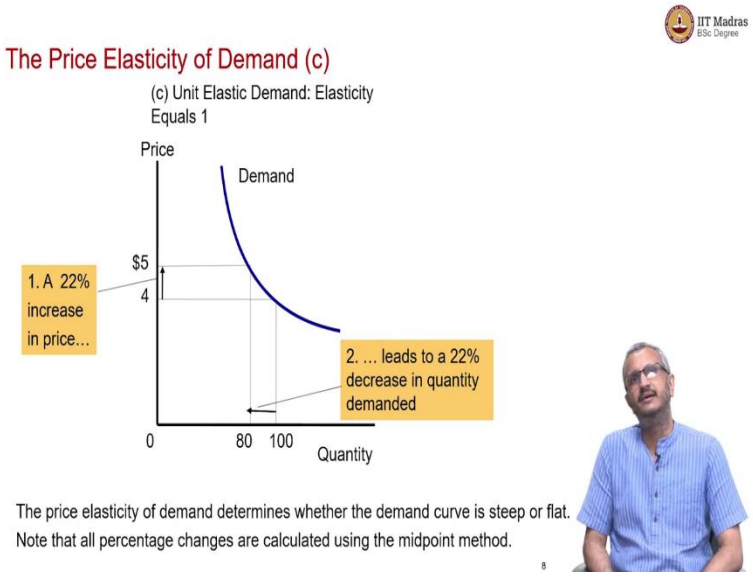

Here, unit elastic demand, that is, elasticity equals to 1.

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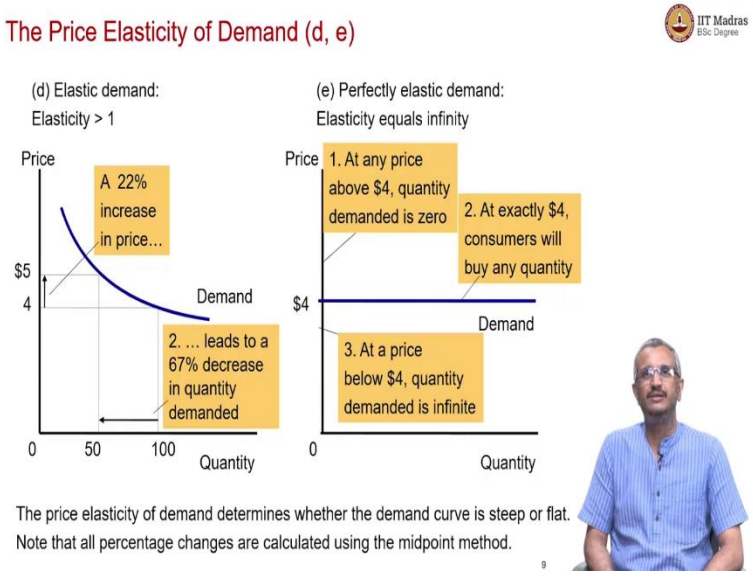

Here, elastic demand where elasticity is greater than 1. And finally, perfectly inelastic demand, where elasticity equals infinity.

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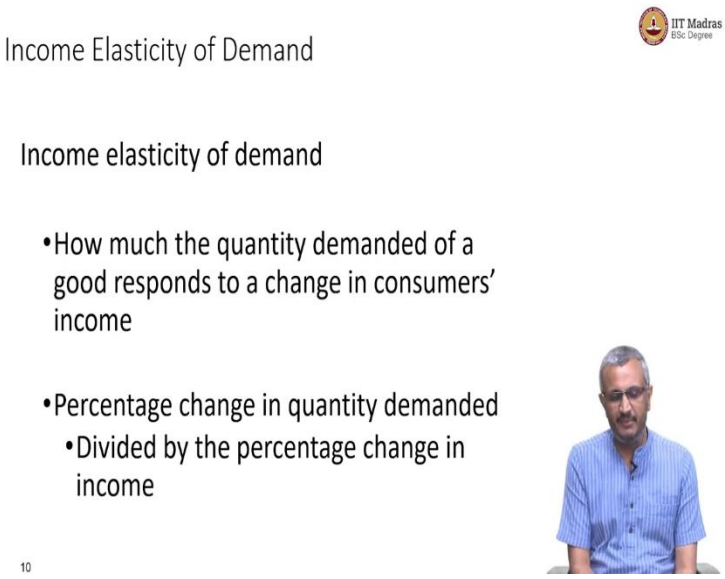

But, so far, we have been talking about price elasticity, exactly like that we can also have an income elasticity of demand. What does it mean? It means that how much quantity demanded of a good responds to changes in consumers' income, not only price, but can also change in market situations. So, it is nothing but the percentage change in quantity demanded divided by percentage change in the consumer's income.

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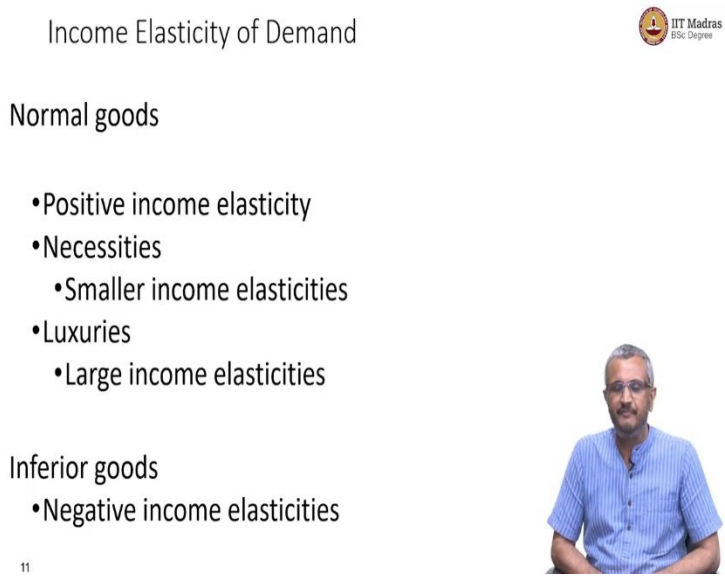

Given the consumer's income, we can classify goods into two: normal goods and inferior goods. Normal goods with positive income elasticity, necessities have smaller income elasticities, luxuries

have larger income elasticities, and inferior goods have negative income elasticities. I will come to that in a minute what are these negative income elasticities.

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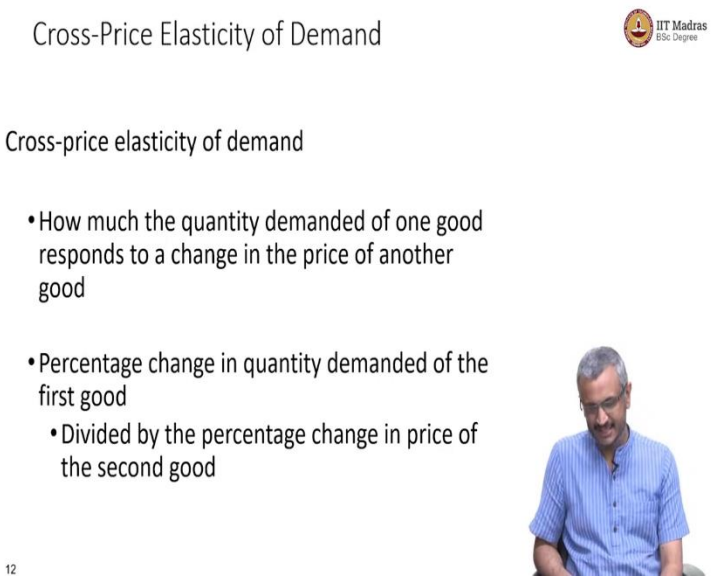

Like price and income, there is a possibility of a cross price elasticity of demand. What does that mean? That is how much the quantity demanded of one good responds to a change in the price of another good. That is percentage change in quantity demanded of the first good divided by the percentage change in the price of the second good will help you compute the cross price elasticity of demand.

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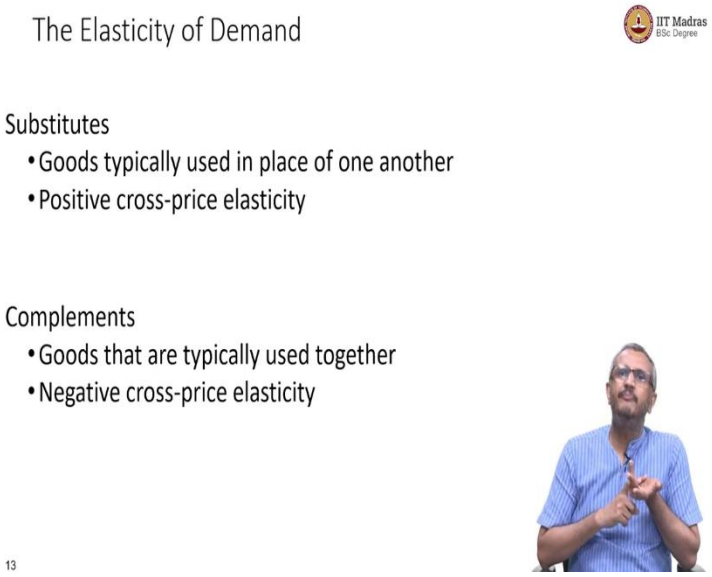

So, remember, there are three variables, price elasticity of demand, income elasticity of demand, and cross-price elasticity of demand. Now, with the cross-price elasticity of demand, we can classify goods as substitutes and complements. How? For substitutes, substitutes are goods typically used in place of another good, which means that there is a positive cross price elasticity.

Complements are goods that are typically used together, which means that there is a negative cross price elasticity, so what I have been trying to tell you is that by examining these elasticities, we can actually understand the nature of good, which is a very powerful insight.

You can understand whether it is a substitute, whether it is a compliment, whether it is inferior, whether it is normal, whether it is a necessity, or whether it is luxury. Fantastic, just one simple concept in terms of elasticities. We are using it in three different context variables: price, income, and price of related goods. That is all we were actually emphasizing here.

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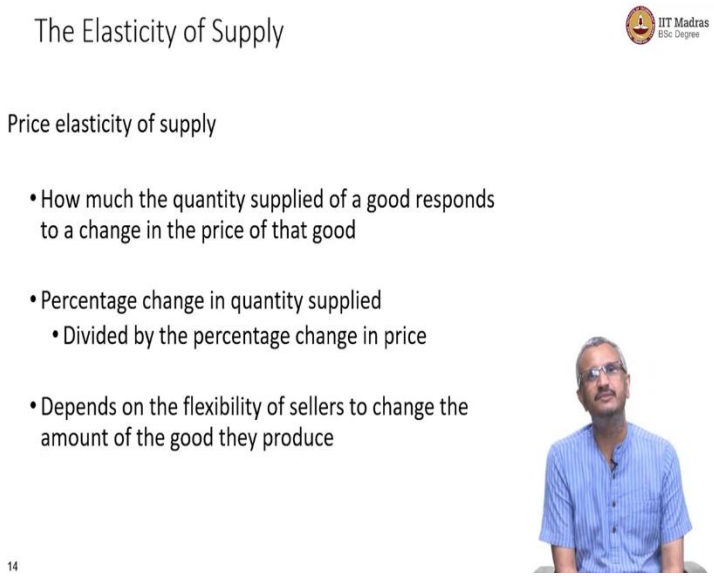

But then I have been talking only about one side of the story that is the demand side. You can also have exactly a similar situation for the supply side. You can have a price elasticity of supply where we can see how much of quantity demanded of a good responds to a change in the price of the good, because at higher prices, suppliers would like to supply more goods.

And that is nothing but the percentage change in quantity demanded divided by the percentage change in price. And that also depends on the flexibility of sellers to change the amount of goods they produce, because all of a sudden you cannot prove certain goods more, just because there is

a change in terms of the goods demand. So, the elasticity of supply is parallel to the elasticity of demand.

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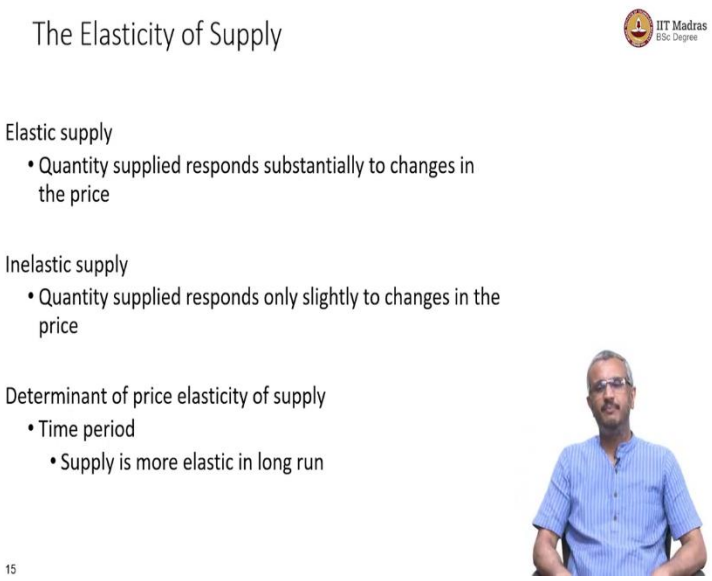

Now, like how we classified goods in terms of elasticity of demand, we can actually classify goods in terms of elasticity of supply. Certain goods have very high elasticity in supply, we call it as elastic supply that is, quantity supplied responds substantially to changes in price, when there is inelastic supply, quantity supplied actually responds only slightly to changes in price and these are all determined in terms of the time period that we have in mind, because sometimes when you have a longer time horizon, you can be a little more elastic in supplying. If it is a shorter time horizon elasticity of supply is constrained by the time period or time horizon that we are talking about.

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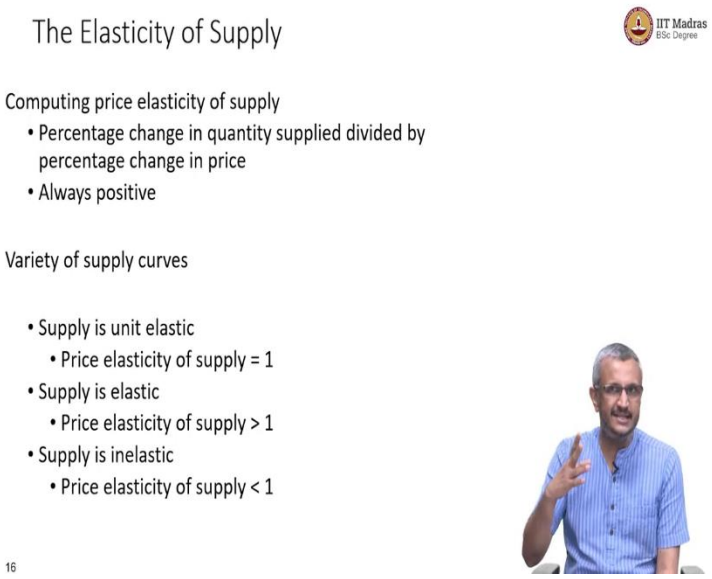

So, when we compute elasticity of supply, again like what we did in the context of elasticity of demand, it is nothing but the percentage change in quantity supplied divided by the percentage change in price that is positive because the supply curve is an upward sloping curve. We have varieties of supply curves, unit elastic, elastic, inelastic, exactly like in the context of a demand curve.

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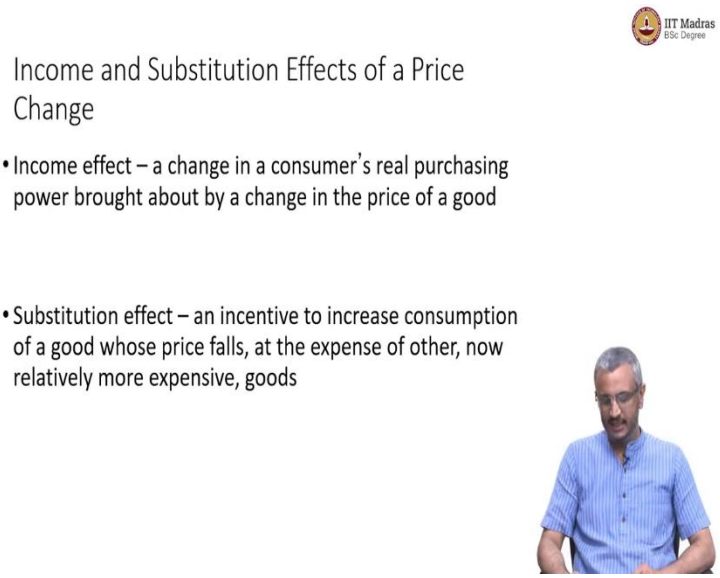

Now, there are two effects which we need to keep in mind when we talk about elasticities, one is called the income effect and the other is a substitution effect. What is the income effect? The

income effect is nothing but a change in consumer's real purchasing power by a change in the price of a good that is, if the price of a good falls and if that good is a part of my consumption basket, then in effect my income is actually increasing.

Because I can use that money with now is an extra because of the fall in the price of a particular good for the consumption of something else, that is the income effect that I am talking about. There is also a substitution effect that is basically an incentive to increase consumption of a good whose price falls at the expense of the other, but the other good now is a relatively more expensive good.

So, you tend to substitute the consumption of one good with another good depending on the price of this another good. So two kinds of effects we notice in the market are the income effect and substitution effect. To analyze this income effect and substitution effect, we use these concepts of elasticities, which were explained in our concepts of elasticities.

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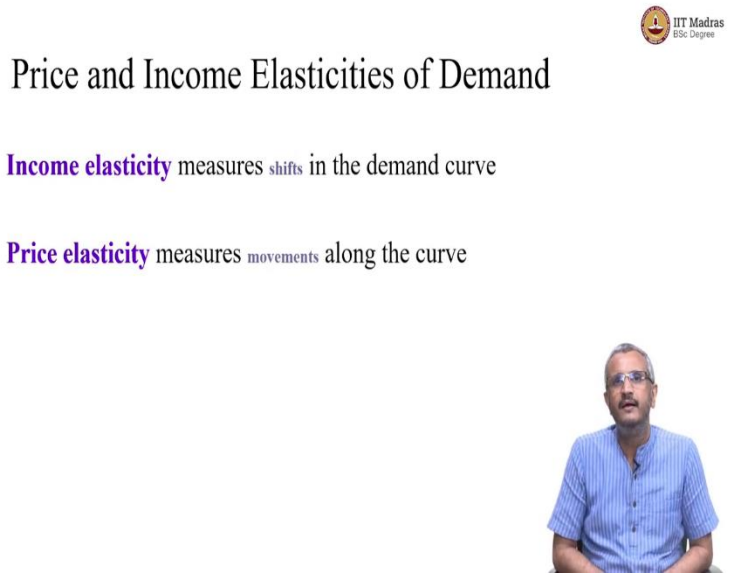

So, let me summarize this whole concept of elasticities. We are trying to understand using the concept of elasticities to understand variations in demand and supply in the market. From our earlier discussions, we understood that the market needs to be in an equilibrium position to have a market clearing price and demand for the quantity.

Otherwise, what happens? Otherwise, there could be shortages or there could be surpluses. So, there are factors that affects demand and supply, to understand how these factors affect demand and supply, we use this very simple concept of elasticities. And we saw first in terms of price

elasticity, price elasticity measures a movement along the curve, it is the responsiveness of demand to price. We also saw income elasticity, income elasticity is a shift in the demand curve.

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And we also use this price elasticity and income elasticity to classify goods, for example, a normal good is a good which has got positive income elasticity, whereas an inferior good is a good which has got negative income elasticity. That is, as and when my income increases the consumption of that particular good might actually decrease.

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And we can also classify goods in terms of necessities and luxuries. Typically those goods which are having an income elasticity between 0 and 1 are necessities and luxuries are goods that have elasticities greater than 1 and we know that necessities are which irrespective of variation in price, we tend to consume either the same quantities or perhaps marginal reductions only.

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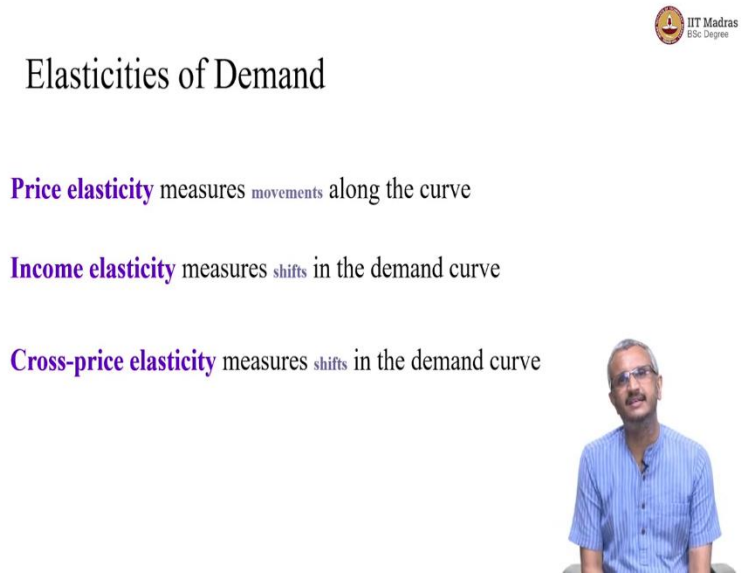

So, these three concepts of elasticities then become very important in our analysis of market situations. 1) price elasticity, 2) income elasticity and 3) cross-price elasticity. Price elasticity measures movement along the curve, income elasticity understands the shifts in the demand curve, and cross price elasticity examines the shifts in the demand curve.

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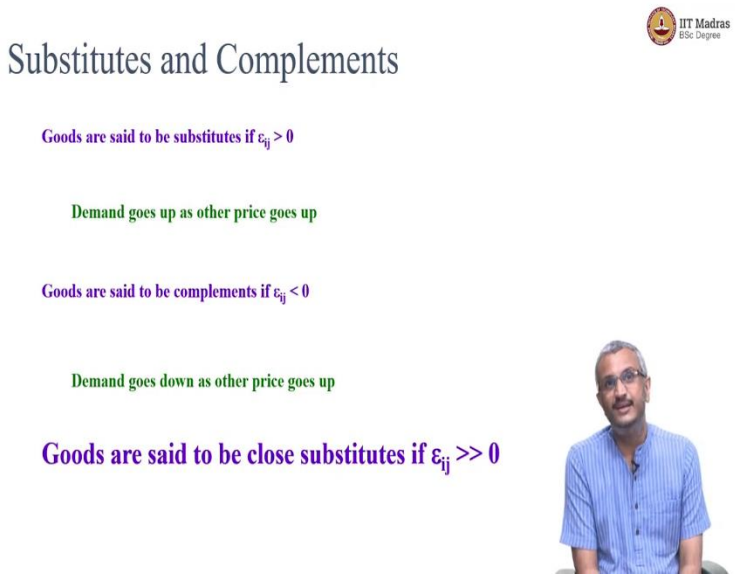

Finally, we also saw that using these concepts of elasticities we can classify goods as substitutes and complements, goods are said to be substitutes, if their elasticity is greater than 0 that is, when the demand of particular good goes up in relation to the price of another good and goods are complements when the elasticity is less than 0 that is, demand goes down as the price of another good increases, we saw examples of that and then we can actually classify goods as close substitutes or near substitutes and arrive at a classification of goods available in the market.

So, well a very simple concept, a simple concept of elasticity then provides us very important insights into the market mechanism. The insights into the market mechanism are in terms of classifying goods, classifying goods into normal goods, inferior goods, complements, substitutes. And in this process of classifying goods, we need data - data in terms of prices of goods, data in terms of incomes and data in terms of prices of related goods in the market.

If we have data relating to these three variables, that is prices, incomes as well as prices of related goods, then we can actually analyse market, classify goods in the market, and understand what the factors that actually determine demand in a market and what are the factors which actually causes variations in demand in the market are. So, that is why these concepts are very important in terms of understanding demand.