

An Introduction to Microeconomics
Prof. Vimal Kumar
Department of Economic Sciences
Indian Institute of Technology, Kanpur

Lecture – 09
Demand: Effect of Substitutes and Compliments

2 reasons that we have figured out, why demand is a downward sloping function because availability of alternatives and.

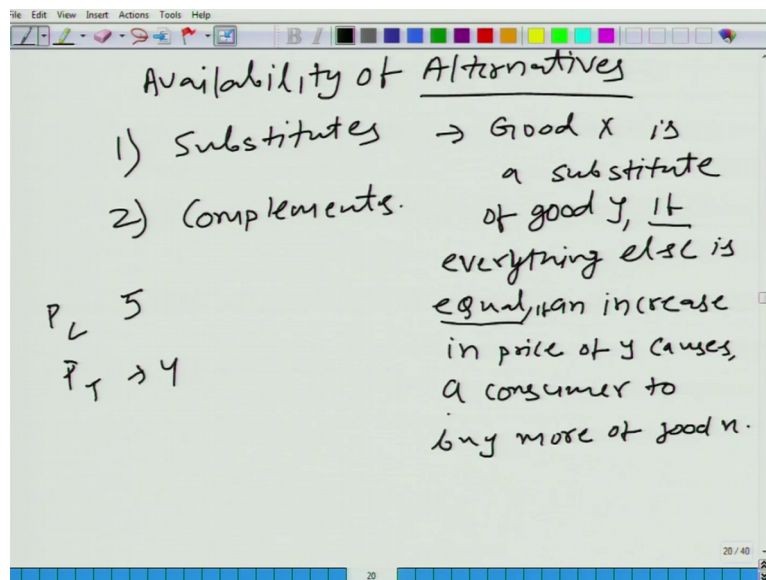
Student: And marginal.

And diminishing.

Student: Marginal utility.

Marginal value 2 reasons. So, let us talk about just little bit of digression, because I want to talk about.

(Refer Slide Time: 00:32)



I want to define availability of alternatives this term alternatives. I want to introduce 2 terminologies, substitutes and complements. 2 terms what is a substitute? Let us say, let me write it good x is a substitute of good y. If everything else is equal and increase in price of y causes a consumer to buy more of good x. So, good x is a substitute of good y if everything else is equal ceteris paribus whatever we are talking about is ceteris paribus.

So, let us ignore this clause; just to you know just to read it clearly good x is a substitute of good y. If an increase in price of y causes a consumer to buy more of good x can you think of a such scenario.

Student: Coffee to tea no, no.

Coffee to tea.

Student: No.

No think about it again coffee to tea, yes let us say let us take an example tea and coffee. Let us say at present price of coffee is 5 rupees, price of coffee is 5 rupees. And price of tea is 4 rupees by the way this is the amount you pay when you travel in train for a cup of coffee and a cup of tea. Now we do not know the taste of a particular individual, but let us say that at present he is buying coffee. He is not going for tea he is buying a cup of coffee by paying 5 rupees.

Now, let us say the price of coffee increases from 5 to 6. It is possibility it is a possibility that he would still he buy coffee 5 to 7, 5 to 8, 5 to 9 there will be a one point when he would shift from coffee to Tea.

Student: Tea.

Unless he hates the completely, but we are talking about a generic person we are not taking a very individual kind of a person very generic person. So, what is happening that increase in price of coffee causes the consumer to buy more of good x, good x is here

Student: Tea.

Tea. So, the consumption of tea goes up, because price of coffee has increased. So, coffee and tea are substitute another close substitutes are Pepsi and coke.

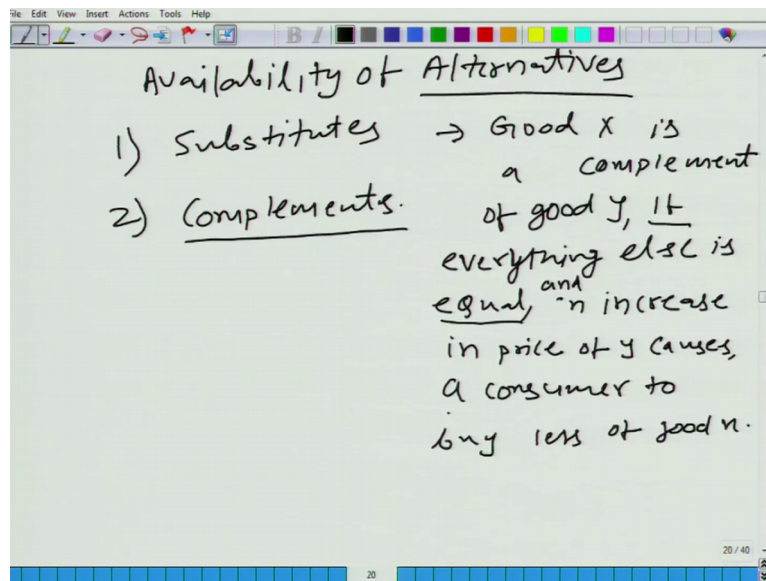
Student: Pepsi and coke sir.

They are close substitute they are let us say if they are priced equally maybe some of us like coke more some of us like Pepsi more. When typically, when there is another reason economic reason would explain why they are priced you know equally always in the market, but that is for some other topic not today so, but if let us imagine when cough coke and Pepsi

are not available for the same price. The relative price will affect your buying decision. And if price of coke goes up definitely on average sale of Pepsi would increase; it means more and more people would consume Pepsi. So, coke and Pepsi are substitutes similarly let me raise this.

Similarly, we can define complements what we have to do everything would remain the same that let us change it.

(Refer Slide Time: 05:15)



Let me change it here good x is a complement of good y. If everything else is equal and increase in price of why causes a consumer to buy less of good x that is the only difference. Less of good x. Now can you give me an example of complement an example where 2 goods are complements bread and butter.

Student: Bread and butter right sir.

Bread and butter. If price of butter goes up most of us do not take bread, alone we always you know most of us put butter on our bread slices. So, a price of butter goes up our consumption of not only butter, but also of bread

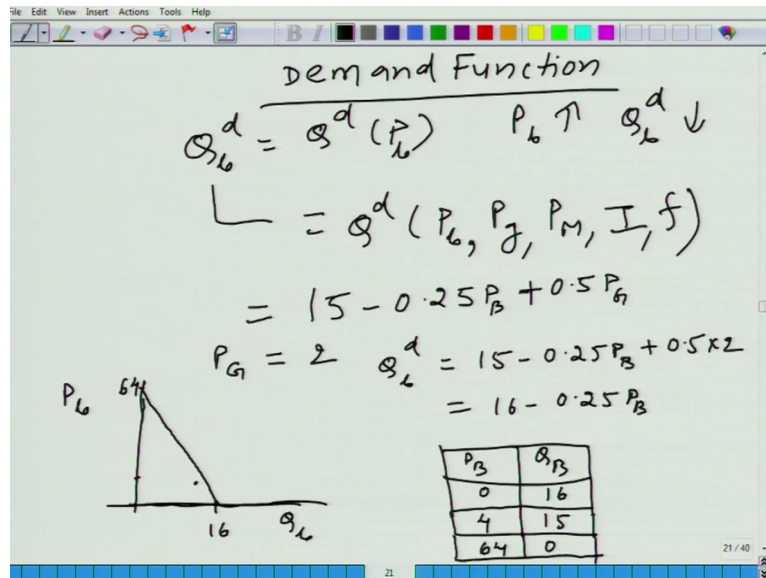
Student: Bread.

Would go down.

Student: Go down.

So, that is why breads and butter are complements. We will study these things in more detail. Coming back to the demand function.

(Refer Slide Time: 06:26)



So, what we have learned that Q is a function of price. Let us say put here banana it does not matter b can be c d anything. This is just a recap that what we have learned that P_B goes up Q_B^d comes down, but we have also learned just now that Q_B^d is not just the function of its own price, but it is function of the price of complements and substitute and if I remember you we are saying that income also affects the buying decision.

So, if you want to describe Q_B quantity demanded of banana is not only a function of price of banana, but also it is a function of.

Students: Input.

Many other variables, again I am know again I am writing without knowing with certainty just for illustration purpose that quantity demanded is the function of price of banana, price of guava, price of milk, if you like banana with milk and it may not depend one has to collect data. That is why in the earlier class I emphasized the role of data we cannot say right oh this is just a theoretical construct that I am saying that the quantity demanded of banana depends on the price of banana, price of guava, price of milk and probably your income and some other factors let us say f just you know, but this is a theoretical construct to really know about the demand function one will have to collect data and analyze that what are the factors

influencing your buying decision for banana. It is possible that price of milk may not affect the your banana buying decision.

But this is just a theoretical construct. So, if I write let me just write one such theoretical construct and I want you to figure out by looking at the equation, whether banana and guava are complement or substitute. And let us say it does not depend on income and factor other factors just 3 or I can say yeah just leave the income out does not matter. So, what do you think?

Student: Substitute substitutes.

Substitutes how about you? We cannot say there are 3 possibility there are 3 different answers you can give, one that they are compliment they are substitutes and third we cannot figure out looking at the equation.

Student: Substitutes.

Substitutes why.

Student: Sir as the price of guava increasing.

Student: It is increasing the demand (Refer Time: 09:57).

So that is why, we this is just by definition guava and banana are substitutes. So, if, but if let us say if instead of plus if we had it as minus then.

Student: Complement.

Then there would be compliment, but let us stick to the plus sign for time being. Now remember when I started talking about the quantity demanded of banana what we said that we would vary the price of banana, and we would see it is impact on the quantity demanded of banana we said everything else would be fixed or held constant. So, let us say for example, we held price of guava constant at 2; it means what we are talking about is demand function is $15 - 0.25 P_b + 0.5$ multiplied by 2 or in other word we are talking about 16 minus.

Student: 0.25.

This is the demand function we are talking about. Can you draw the demand function, try to draw again when we draw the demand function, what we will have? We will have quantity of

banana on x axis price of banana on y axis remember we are taking the price of guava fixed, we are taking price of guava fixed.

So, how can we draw. Here if you pay attention and if you know a little bit of coordinate geometry this is an equation of a

Student: Straight line.

Straight line. So, when you know it is an equation of a straight line you have to figure out 2 points on this line, and then just joining them would give you the graph, but if you do not know that this is the equation of a straight line what you need to do is to draw a table. And what you can have here is where you can have P_b here you can have Q_b .

Student: Q_b .

So, when let us say, let us do it just an exercise let us say when price of banana is 0 how many of how many bananas do you demand in the market?

Student: 16.

16. When you have let us say, let us do it in you know we cannot draw the infinite point let us just do 3 points when price of.

Student: Banana.

Banana is 4 how many units will you demand?

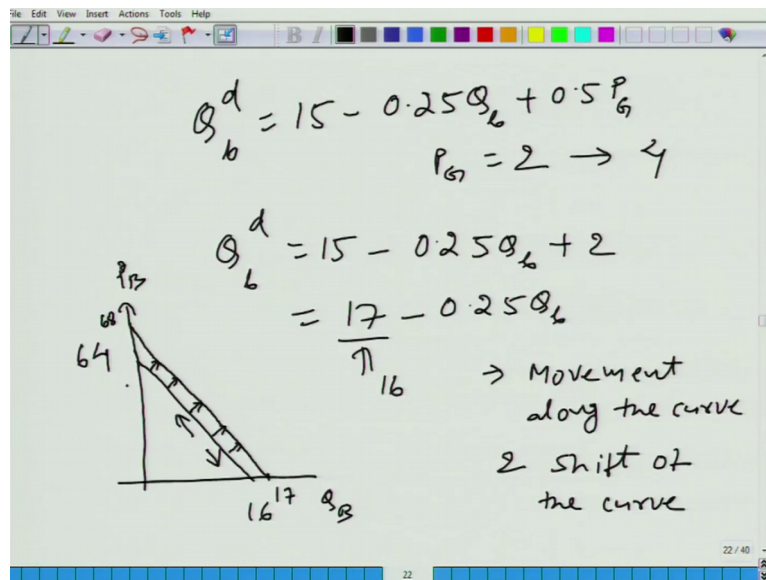
Student: 15.

15 and then similarly if you have let us say 64 how many units will you demand?

Student: 0.

0 and similarly you can you should draw a bigger table with more numbers if you want to be more signs about your graph. So, how would it look like let us say P_b is equal to 0 P_b 0 on this line. So, here we get as 16, and when it is 4 it is 15, and when it is 64 we can match like this here it is 64. Fine remember that is how we get the demand function on the graph of the demand function.

(Refer Slide Time: 13:51)



Now, what I want you to do continue with the same equation it was 15 minus 0.25 Q_b plus 0.5.

Student: P.

P.

Student: G.

G. This was the equation we have used and we started with p_g equal to 2, but now what I am saying let us say that the price of guava has changed from 2 to 4, 2 to 4 what we will get? Now let us rewrite it what we get here 15 minus 0.25 Q_b plus.

Student: 2.

2, and here we get 17 minus 0.25 Q_b remember earlier this number was 16. So, this number has changed. So, what we get is a new demand function; it is not the same demand function we get the new demand function, and similarly you can draw a table if you draw, remember this is what we had earlier 16 here we had 64 this is P_b this is Q_b . If you draw this what you will get here 17 and here?

Student: 68.

68.

68. So, what did we observe? We observed a shift in the demand function. We observe a shift in the demand function. Why did we observe the shift in the demand function? Because price of guava changed in the market now let us understand the difference between movement along the line movement along the curve.

Student: Shift.

And shift, shift of the curve. These 2 are 2 different things, when the price of banana changes while everything else is fixed, everything else is held constant then what do we get we move along the curve, like price of banana is changing from 0 to 64 we move and on this curve.

But when price of guava changes, when price of guava changes then we get a shift of the demand curve. So, it is very, very important to understand the difference between movement along the curve and shift of the curve. When we are talking about a demand function we are talking about all other things are held constant, and we are talking about a relationship between price of a good and the quantity demanded of that good if price of that good changes of course, quantity demanded would change in most of the cases, and what we will observed is movement along the curve.

But if it is the price if the price of not the good that we are talking about changes then we are moving out of this construct that all other things are held constant, we are changing some of those things, and then we do not get movement along the curve we get shift of that curve, we obtain a completely new demand function fine.