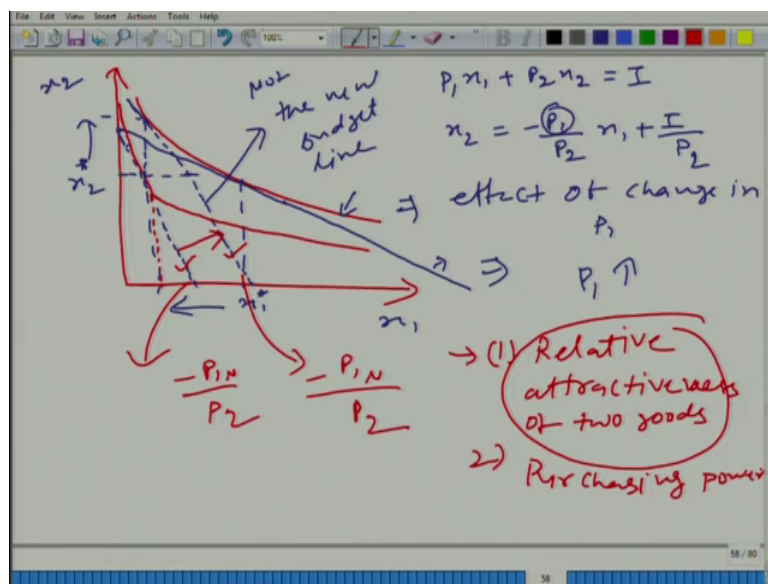**An Introduction to Microeconomics**
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Lecture - 66
Substitution Effect and Income Effect

Now we are going to study the effect of change in price on optimal bundle from a different angle ok.

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Let us look at it what happens? Here we have let us say this is our; this is what we have; this is let us say again this is x 2 this is x 1, and this is the bundle.

Let us pay attention to the budget line what is budget line P 1, x 1 plus P 2, x 2 is equal to I this is the budget line or what we can write x 2 is equal to minus P 1 by P 2 x 1 plus I by;

Student: P 2.

I by.

Student: P 2.

P 2. So, if P 1 changes P 1 changes what happens if P 1 changes.

Student: Amount of x 2 would change and x 1 change.

Amount of.

Student: X 2 and x 1 both will change.

At optimal level of course, both will change, but the point here is that the effect of change in P 1 we can decompose it into two part effect of change in P 1. Because two roles that P 1 is playing change in P 1 would bring to the optimal consumption bundle. One effect would be like let us say that relative attractiveness of these 2 goods.

Now, let us say everything else is same and the relative price forget about the actual price that everything is same just the relative price of good 1 and good 2; good 1 with respect to good 2 has changed ok. So, in other word if everything else is same it means this person should be is getting the same utility.

And of course, how we are able to manage it that we will see it later how we do it, but let us say this person is getting the same utility, but now the prices of these 2 goods are different in the economy and let us say that P 1 has gone up.

So, what will happen if we are on the same utility level then the new budget line should be tangent to this utility function this utility level this indifference curve and how would it look like because P 1 has gone up. So, then this line would become steeper.

So, it will be something like and what will be the optimal level. There will be decrease in amount of;

Student: X 1.

Good 1 consumed and there will be;

Student: Increase in amount of good 2.

Increase in amount of good 2 consumed that is one effect because of change in price, but artificially because if price is changing let us see what happens to the budget line income remains the same. So, we will not this is not the new budget line, not the new budget line.

What will be the new budget line? Of course, the maximum amount of quantity 2 that can be bought in the market would not change because of change in price of good 1. So, and what I am saying that P 1 has increased. So, then budget line will rotate pivoted at this particular point and it would rotate in.

Student: Clockwise.

Clockwise direction; so, the new budget line is going to be like this so how did we get this budget line what did we say here if budget line will rotate then this utility level it becomes unachievable unless the optimal point is a corner point. So, I am not talking about those scenarios. Unless it is the optimal point the corner point is the optimal point the earlier utility level cannot be achieved in this new scenario.

Fine.

Student: Yes sir.

So, let me say again it would be something like and of course, I am drawing I am sorry. This is the new bund, new optimal bundle fine and of course, this is approximation this is not exact graph ok.

So, now how did we move from here to here; what is the difference? So, what we are basically doing now because the budget line is changing, but we want to yes we want to reach to the same utility level. So, artificially we are giving enough income to this consumer so that he is able to achieve the same level of utility in this new changed.

Student: (Refer Time: 06:05).

World and why this world is different because the prices of the price of good 1 is;

Student: Change.

Different. So, basically in that case this line and this line these 2 lines should be parallel because the slope of this line is new price P 1 divided by P 2 and this line also has the slope new P 1 new if I want to say P 1 new divided by P 2.

What is the difference that here this person has little more income and art we did it artificially. We did it in a way so that this person is able to achieve his earlier utility label

and why did we do it because we want to untangle the effect of change in price into two different component that price is doing two things.

One it is changing the relative attractiveness of 2 goods and second what it is doing it is also decreasing the purchasing power of the consumer. How it is decreasing? Let us say rather than expressing this person and person's income in rupees let us say the good 1 is food, and good 2 is cloth.

Let us say food is 10 rupees per kg, and the income of this person is 100. So, we can express this person income in terms of food that would be 10 units of food. But now the price of food let us say it goes up from 10 to 20, it goes up from 10 to 20. Now his income is just 5 units of food. So, there is decrease in his purchasing power ok. So, change in price is bringing doing 2 different things; one it is changing the relative attractiveness of good and it is also changing the purchasing. Fine ok. So, when we talk about this first one.

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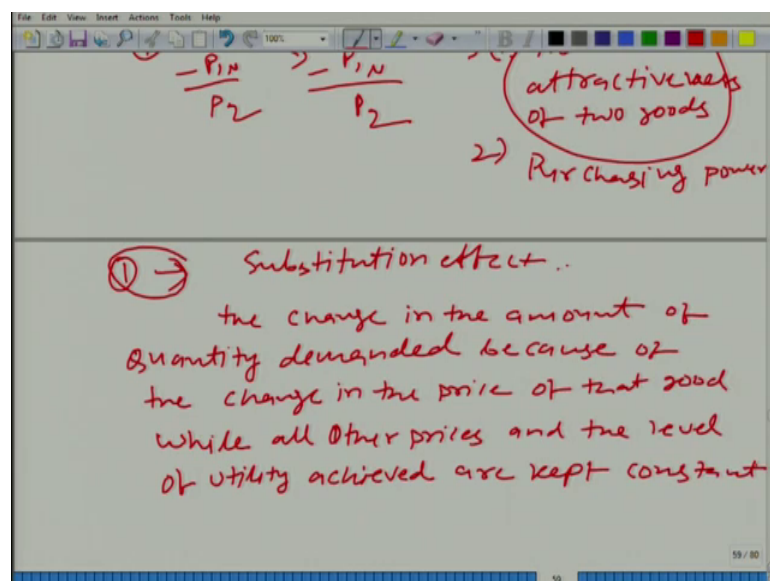
When we talk about the first one that it is changing the relative struct attractiveness of the good that is what we did here that what we did we kept the utility level fixed, and we changed the budget line so that the new budget line remains change in to the;

Student: Same utility level.

Same utility level and so that is why we are keeping everything fixed. Here we there is only one change income is not changing in the real terms only the relative attractiveness of these 2 goods are changing because of change in price of good 1.

Student: Sir, income is changing.

Here income again income is changing, but in the other in the purchasing power term, it is not changing what is the role that income is playing here that income is used to achieve certain utility level. So, the monetary value of income may be different, but in terms of utility achieved it does not changed the person is achieving same level of utility ok.

So, in the real sense income does not change ok. In nominal since it has changed so in that sense I am talking about that income real income remains the same because same level of utility is being achieved in this case.

So, this here is gives us substitution effect. Let me give you the definition the change in the amount of quantity demanded, because of the change in the price of that good while all other prices and the level of utility achieved are kept constant.

Fine. So, again let us look at it here.

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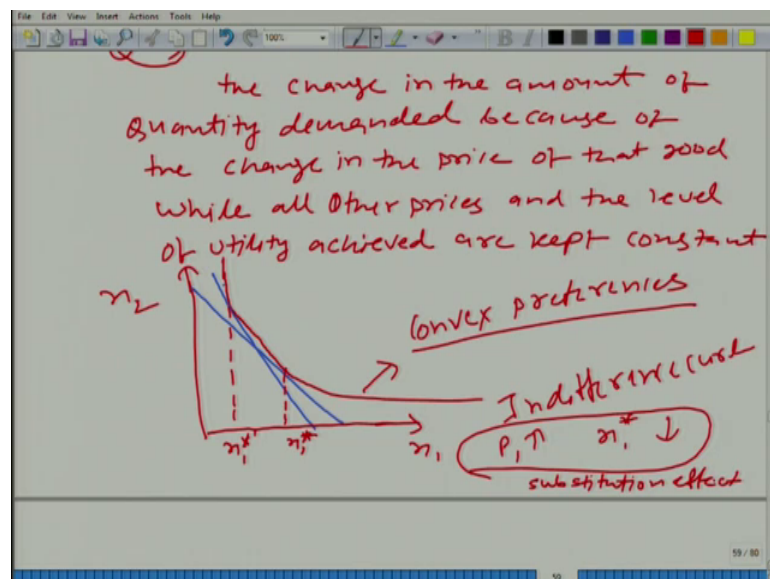
This is the utility indifference curve achieved in the maximum the maximum level being achieved in this case here we have x 1, and x 2 and earlier this is the x 1 star that is the quantity demanded for good 1 and now the new one is x 1 star dash.

Fine; clearly whenever we have convex indifference curve, or convex preferences that would be more appropriate. Convex preferences fine then what will happen if P 1 goes up x 1.

Student: Goes down.

Start goes down and this I am not talking about overall effect. I am just talking about because of.
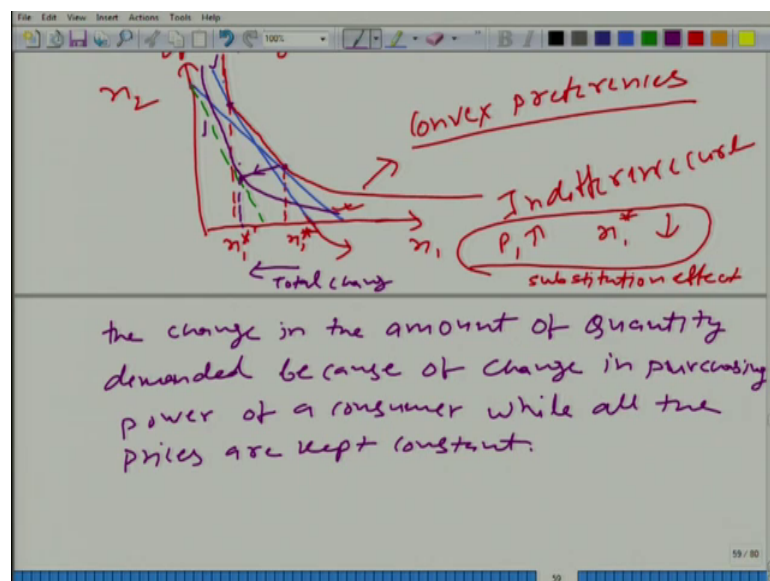
Student: Relative prices.

Substitution effect;

Student: Hm.

Because this is the substitution effect we are changing only the relative attractiveness of the good, but this is something artificial because we have we this is the original.

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Budget line and the new budget line that we are using is this one we are artificially jacking up the income of this person so that he is able to achieve his earlier utility level in the new scenario.

But this is done artificially what is really happening that because of change in income this will budget line will become something like this. And then we can have let us say optimal here. Something like this, this is the new optimal level.

Fine.

And so we can trace 2 changes from here to here and then from here to this is the final. So, this change is the total change.

Student: Total change.

Total change and how about change from here to here.?

This is changed because of;

Student: Substitution effect.

Substitution effect and then what is remaining from this artificial point to the final point.

Student: Income.

What is that change?

Student: (Refer Time: 14:06).

That is the change in quantity demanded because of income effect ok. So, let me write what is income effect the change in quantity change in the change in the amount of quantity demanded because of change in purchasing.

Student: Power.

Power of a consumer while all the prices are kept constant, fine. So, remember these 2 lines, this budget line, and this budget this artificial budget line and the new budget line they are parallel to each other. So, it means the relative price of these 2 goods are

Student: Same.

Same; shat is the difference the income level, the real income level are;
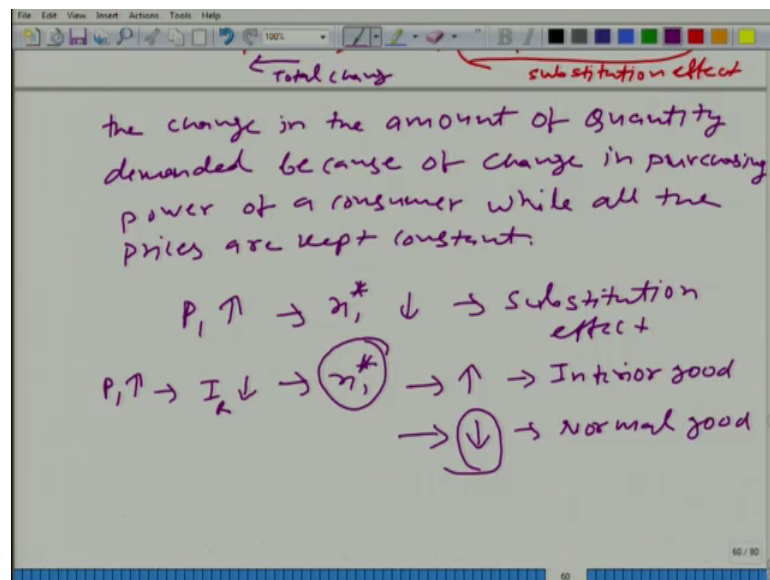
Student: (Refer Time: 15:32).

Different.

Purchasing power is different. So, this change is because of only purchasing power fine..

Student: Ok.

Now, let us look at it substitution effect whenever P 1 goes up. Let me write it here P 1 goes up x 1 star decreases.

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Just your substitution effect; can we say something similar for the income effect?

Student: No sir.

No we cannot say there are 2 scenarios here that we you have studied already that either it can go up or it can;

Student: Go down.

Go down here. Let me introduce P 1 is going up. So, what is happening income is;

Student: Decreasing.

Income real is decreasing. And the one when real income is decreasing and x 1 star is going up it means this is;

Student: Inferior good.

Inferior good and this is;

Student: Normal.

Normal, good. So, in case of normal good the substitution effect and income effect they work in the;

Student: Same direction.

Same direction; but in the case of inferior good substitution effect and income effect.

Student: (Refer Time: 17:04).

They are in the opposite direction.