Managerial Economics
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Lecture - 13
Consumer Behaviour (Contd…)

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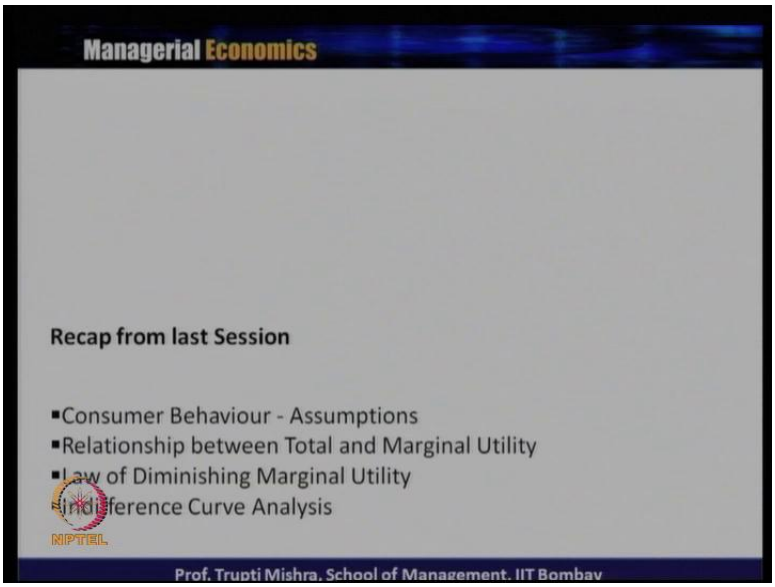

We will continue our discussion on Consumer Theory or Theory of Consumer Behavior in this session also. So, if you remember in the previous session, we talked about the assumption what is generally taken in the theory of consumer behavior or when we do the consumer behavior analysis. Then when introduce the concept of total utility, marginal utility. How both of them they are related to each other. And this is the total utility and marginal utility is generally based on the perception of the consumer on the satisfaction, what they get after consuming the product.

Then, we introduce the concept of law of diminishing marginal utility, which tells us that; when a consumer go on consuming product after a certain point of time generally the marginal utility diminishes, and sometimes it even reaches to 0, and sometimes you get it the negative marginal utility. Then we introduce the concept of indifference curve analysis, which is a part of ordinal utility analysis. And here we discuss about the different properties of indifference curve. Then what is the rate at which the goods get substituted with each other like the marginal substitution. And also, we discussed about

the different kind of indifference curve like, when the nature of goods are different like complimentary goods are maybe the substitute goods.

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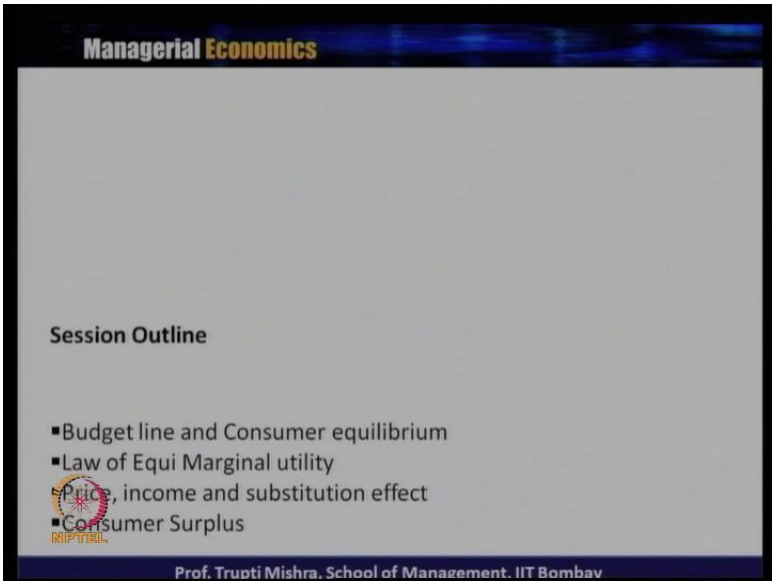

So, in today's class, we will carry our discussion on the budget line. How the consumer incomes get limited by the consumer preferences. Then we talk about the consumer equilibrium keeping budget line the constraint is the budget line or the budget constraint. Then we will introduce the concept of law of equi marginal utility.

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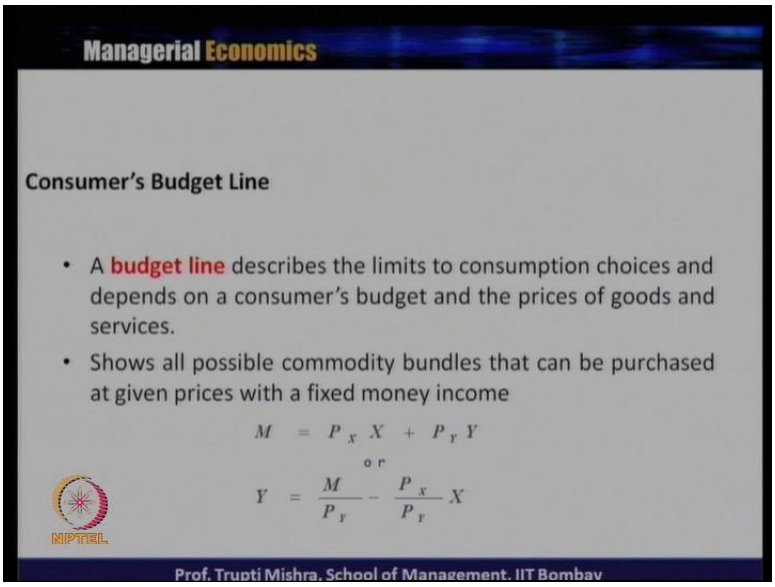

Then, we will discuss about the price income substitution effect. And finally, our discussion point will be on consumer surplus. So, what is a budget line? So, till the time we know that indifference curve gives us the consumer preferences. And at the same point, it also gives us the different combination of goods and services, which get the same level of satisfaction.

Now, more is always better for the consumer, but when it comes to affordability of the consumer always the income pose as a constraint. So, the consumer income is here, we consumer income, we represent in term of the consumer budget line. And budget line describes the limits to consumption choice, and depends on the consumer budgets or the prices of the goods and services.

So, it shows all possible commodity bundles that can be purchase at a given price with fixed money income. So, income is fixed, budget line shows us the different kind of goods, and services what the consumer can consume with this typical fixed income.

So, in this case, if you consider M is the money income. And if the total consumption basket of the consumer is just consist of just 2 goods X and Y. Then the total budget line will be represented in term of M, which is equal to P x X plus P y Y.

Now, why this is only P x X and P x Y? We are assuming that the entire money income of the consumer is getting spent only on the consumption of goods X and Y. So, P x is the price of X, P y is the price of Y. So, the x is the quantity of X, and y is the quantity of Y. So, entire money income is getting spent on the X and Y, and since it is equal to income the price of X. And price of Y is also multiplied along with the quantity of x and y.

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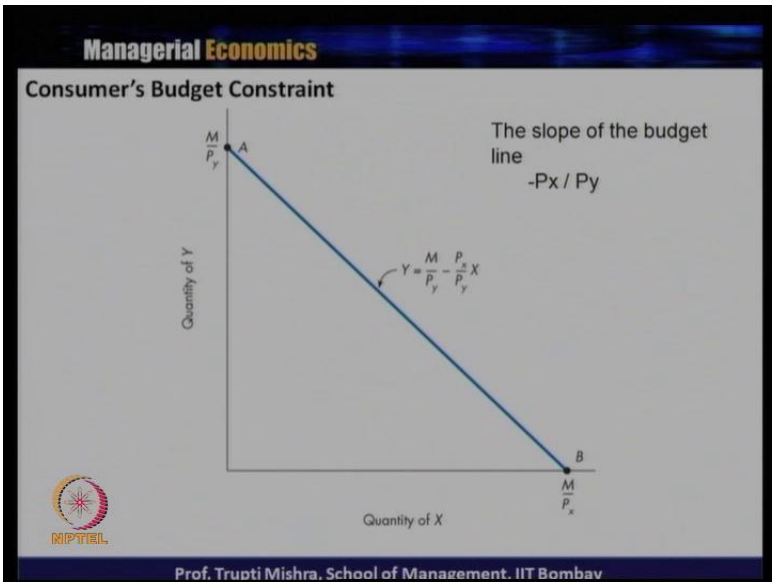

So, this is the graphical representation of the budget line. And if you look at here, we represent in the graph A and B as the budget line. Then, at the point A, if you will get the value is equal to M is equal to P y. And how you get the value of A at the point Y axis is equal to M by P y, because the entire money income is getting spent on only in the consumption of good one of the goods.

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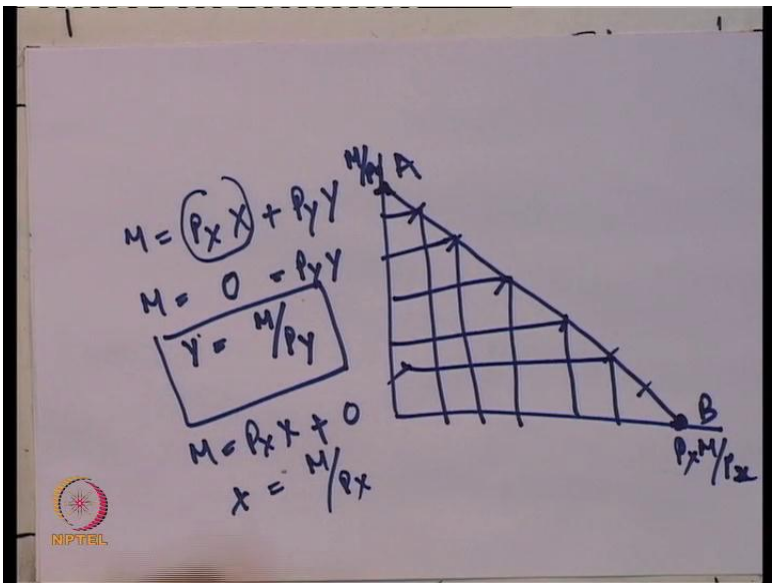

Similarly, M by P x, if you look at the other extreme here also the entire consumption is getting spent only the consumption of the goods and services. Let us see, how we can

draw this budget line. So, if you remember this the budget line equation is P x X and P y Y. So, if we assume that the entire money income is getting spent only on consuming Y. Then this term becomes 0, and if you solve for Y. Then you get the value which is M is equal to P y, which we get here that is M is equal to P y.

Then similarly, if you spent the entire money income or if the consumer is spending entire money income only on X. Then the second item becomes 0. So, this M is equal to P x by X and the value of X is P x. So, here we get the value which is equal to M by P x. So, if you join this 2 point, what is the significance of these 2 points? Suppose this is a; suppose this is B at this point A. The entire consumption is this entire money income is getting spent only on consumption of y.

And at this point the entire money income of the consumer is getting spent on the consumption of x. And in between all this point, it gives us the different quantity of x and y. So, any point in this range will give a mix of combination of goods x and y whereas, this 2 extreme point gives us that, when the entire money income is getting spent only on the consumption of the specific good.

In case of horizontal axis, this is on the consumption of good x. And in case of vertical x is in the consumption of good y. So in difference curve gives us the consumer preferences on goods and services. And whatever the satisfaction they get out of it. And budget line gives us, what is the possible combination of x and y can be consumed with a fixed money income of the consumer. We have simplified this analysis of indifference curve, and the budget line to 2 goods just for the simplicity of it. When you just take 2 goods otherwise also, there is an option when you have more goods and services. You can cluster them into specific groups, and you can represent them in the indifference curve.

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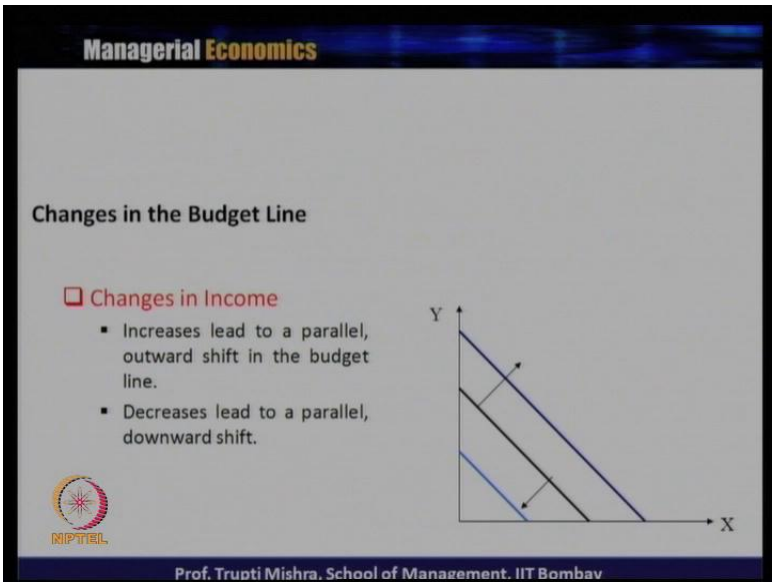

So, we have introduced the concept of the indifference curve in the previous session. And this session, we have introduced the case of the budget line. With the help of this, we will see how the consumer is reaching the equilibrium, but before analyzing the condition of consumer equilibrium. We will see that in which case, the budget line gets changes. First, when there is a change in the income. So, whenever there is a change in the income, it increases in the income leads to a parallel outward shift in the budget line.

Like, if you look at the third line that is the increase in the income from the original budget line. And decrease always in the downward direction. So, increase in the income lead to a right shift in the budget line. And decrease in the income leads to a left shift in the budget line.

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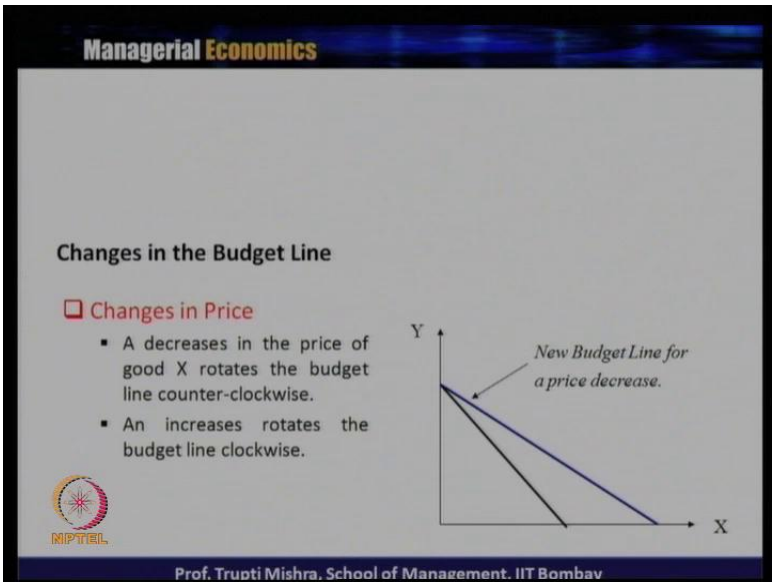

So, 1 is upward in case of increase and downward in case of decrease. Now, what is the change in the budget line, when there is a change in the price? A decrease in the price of good X rotates the budget line counter clockwise? If you, when you can see in the graph. So, the initial budget line is the black line.

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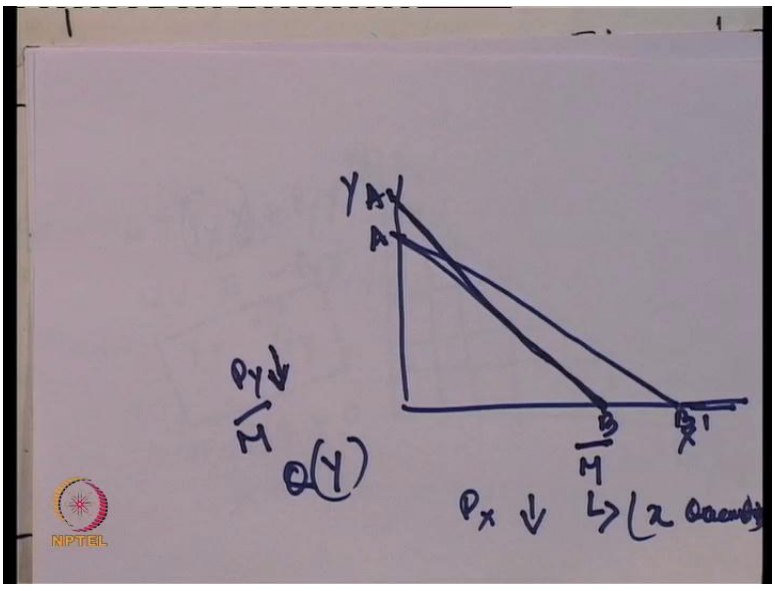

And when there is a change in the price of the goods. Now, with the same amount of money income; the consumer can consume more of good x, and because of this the

budget line shift to the right. So, if you look at this case, if you are considering here as the X, here you are considering as the Y.

This is the original budget line. Now, price of X decreases, so with the same money income. Now the consumer can still have more quantity of x, as the price of price of x has decrease. So, in this case the budget line will shift to the right, this is the new budget line. So, this is A B; this is A B 1. Now, suppose the price of y decreases. Now, the same money income now, the consumer can have more quantity of Y. So, at this point B remain constraint.

Now, the curvature will change in case of Y, and suppose this is A 1 B. So, the new budget line is A 1 B, if the price of y is decreasing. Now, it will move in the opposite direction. If the price of x is increasing or price of x is, price of y is increasing. This is the case in the previous case; we analyze the decrease in the case decrease in the price of X and price of Y. And the scenario will change, when the price of X will increase or price of y will increase.

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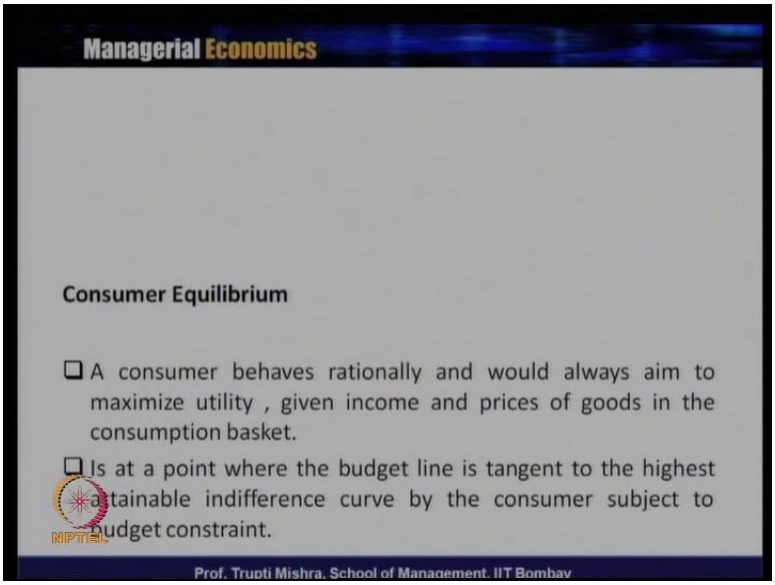

Now, we will see how to reach the consumer equilibrium? Consumer equilibrium is the point. This is the optimal consumption for the consumer. And what is the optimization problem for the consumer? The optimization problem for the consumer is to maximize the satisfaction.

So, consumer behaves rationally, and would always aim to maximize the utility given the money income prices of the goods in the consumption basket. So, irrespective of the price of the goods, and services the income keeping this as a constraint. The consumer always behave rationally, and always see that how they can maximize the utility.

It is at a point, where the budget line is tangent to the highest at a level of indifference curve by the consumer subject to the budget constraint. So, graphically how you get the point of consumer equilibrium? It is at a point where the budget line is tangent to the highest attainable indifference curve by the consumer subject to the budget constraint.

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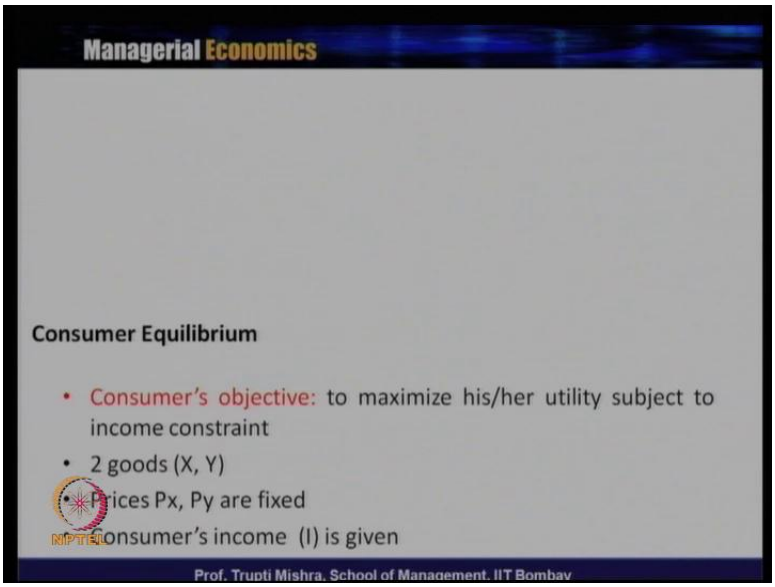

So, what is the consumer objective or what is the consumer optimization problem; to maximize his or her utility to the income constraint? We have kept 2 goods in this case; 1 is X and other is Y. So, the consumer consumption basket is consists of 2 goods X and Y. Price of both the x and y are fixed like P x and P y are fixed. Consumer income is given. So, price X and Y is fixed, income is fixed, 2 goods are there x and y. And the consumer objective is to maximize his or her utility subject to the income constraint.

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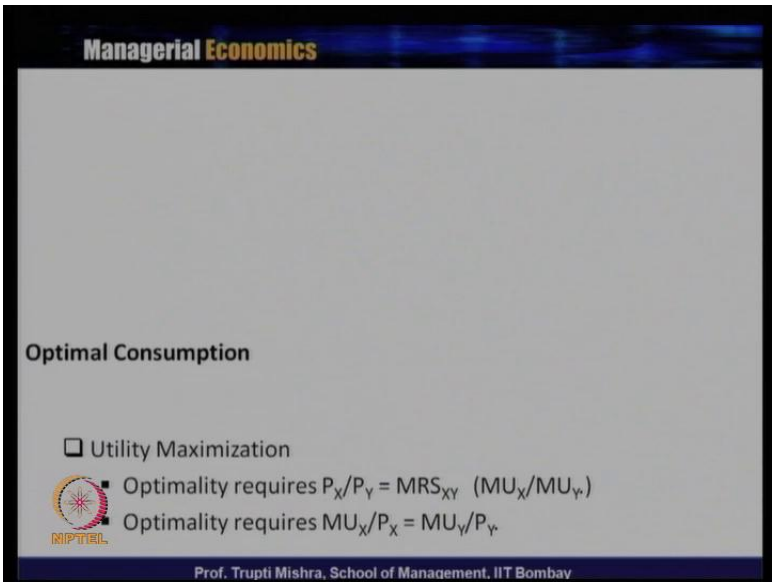

Now, what is optimal consumption? Optimal consumption is the point at which the consumer maximize the utility or where the utility maximizing take place or that is point where the consumer equilibrium. Now, what is the precondition for this optimality or what is the precondition for this utility maximization? It requires that the slope of the budget line is equal to the slope of the indifference curve. So, in the previous case, if you remember the budget line is A B right.

So, at the point A; this is we get a value that is M is equal to P y. And at the point B we get a value equal to M by P x. So, corresponding to this, what will be the slope of the budget line? The slope of the budget line will be P x by P y. And, as we know previously that the slope of the indifference curve is marginal rate of technical substitution is that is M R S x y, which is also equal to the ratio of marginal utility of x and marginal utility of y?

So, optimality requires the equality between the ratios of marginal utility and price of x, which is equal to the marginal utility and price of y. So, we have 2 goods in this case, price of x and price of y is fixed, income is fixed.

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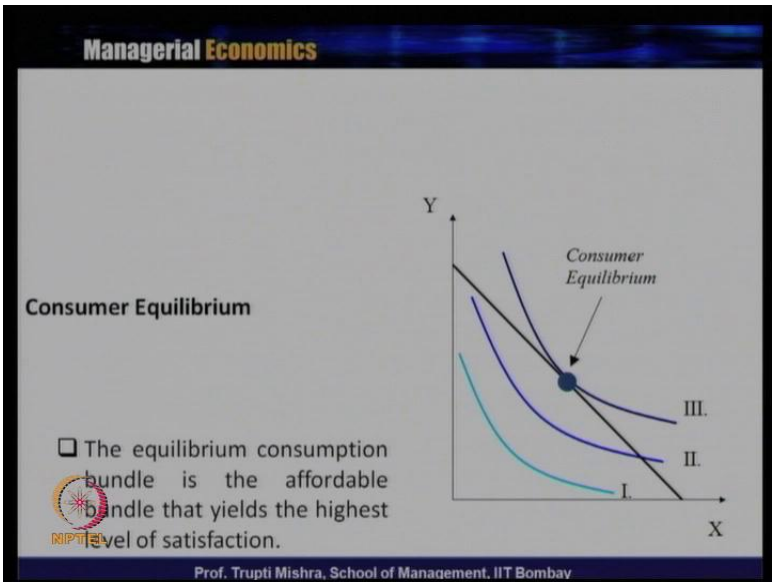

The optimal consumption or the want at which the consumer will reaches the equilibrium. At this point the ratio of marginal utility and price of x should be equal to the ratio of marginal utility and price of y. So, now if you look at in the graph, at this point you look at the arrow mark; this is the point of consumer equilibrium

Why this is the point of the consumer equilibrium? Because this is the equilibrium consumption bundle is the affordable bundle that in the highest level of satisfaction. The consumer can pick up the combination in the indifference curve 1. The consumer can pick up a combination in indifference curve 2.

The consumer can also pick up a combination good X and Y in the indifference curve 3. But the consumers since the optimality or since the optimization problem for the consumer is to maximize the satisfaction, maximize the utility. That is the reason the consumer will reach the equilibrium.

At this at the point in the indifference curve, because that gives a highest level of satisfaction and also the combination in indifference curve 3 can be achieved with the constraint in the form of the budget line or constraint in the form of the income. So, the straight line is the budget line, there are 3 indifference curves.

And the consumer will always pick up a point in the highest indifference curve, because that will give a higher level of satisfaction or the higher level of utility. And that goes the basic optimization problem with the consumer.

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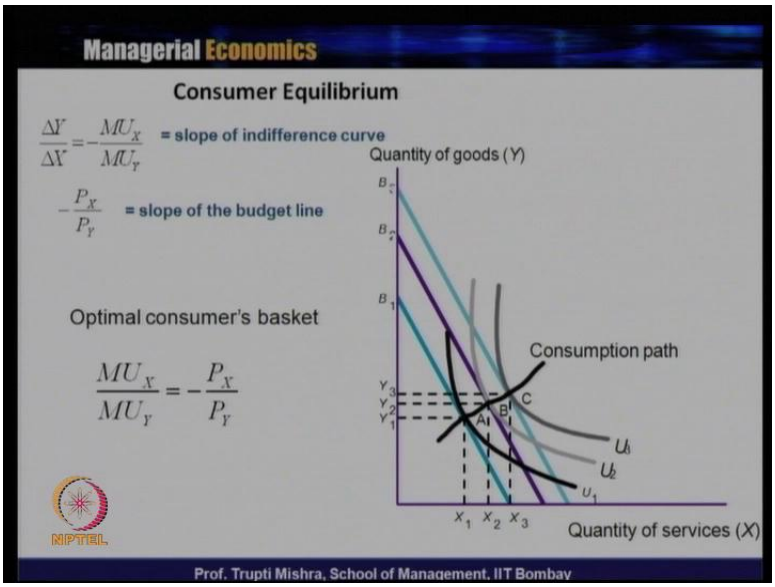

Now, we will check what is the condition for this consumer equilibrium in detail? So, del y by del x or ratio of marginal utility of x or y is the slope of the indifference curve. P x by P y is the slope of the budget line. And what is the consumption? What is the precondition? What are the conditions for the optimal consumption? That is ratio of marginal utility of x and y marginal is equal to the ratio of price of x and y. So, if you look at there are 3 points A point B and point C.

All these 3 points, the consumer is reaching the equilibrium. Because U 1 is one indifference curve, U 2 is the second indifference curve, and U 3 is the third indifference curve. Similarly, we have 3 budget lines B 1 B 2 and B 3. Now, suppose consumer has the income, which is equal to B 1. Now, having the equilibrium B 1, the consumer can only pick a point or in case of combination in the case of indifference curve 1 that is U 1.

Suppose the income increases for the consumer from B 1 to B 2. Now the consumer can prefer a quantity or prefer a combination of x and y in the higher indifference curve that is U 2. So, that is another consumer equilibrium point at the point B.

Similarly, when the price of B 3 increases or the income of the consumer increases from B 2 to B 3? The consumer can again achieve a higher level of satisfaction by choosing a combination as the indifference curve 3 that is U 3. So, if you join these 3 points A B and c. We reach to a path which is consumption path. And why this is known as the consumption path, because when the income increases the consumption pattern of the consumer. And if you look at each equilibrium point the consumer maximize the satisfaction.

So, after joining point A B and C, all these are consumer equilibrium point, we get as the consumption path. So, consumer equilibrium is the point, this is also known as the optimal consumption or this is also known as the, may be the best consumption for the consumer, because they get a higher level of satisfaction or the highest level of satisfaction with a limited income with a fixed income.

And when the prices are also fixed and how this can be achieved? There are 2 points to achieve this; 1 at this point, where the ratio of the marginal utility. And price of x is equal to the ratio of marginal utility and price of y.

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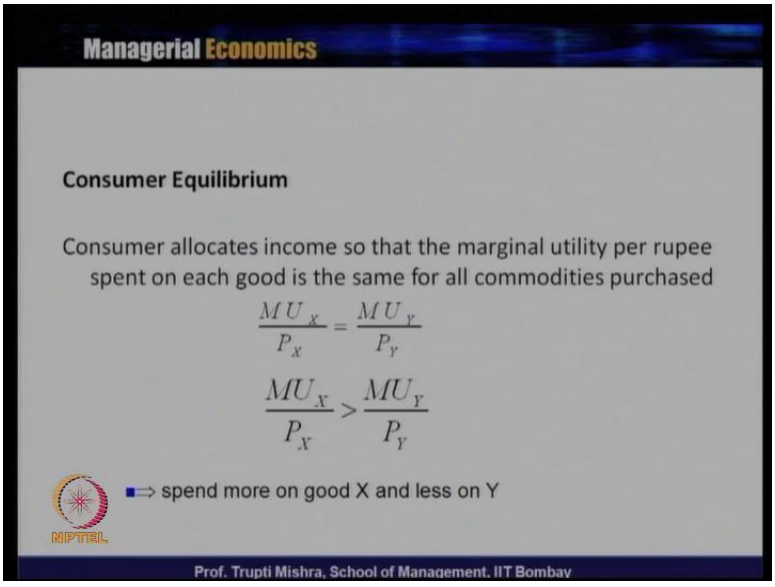

And geometrically, this is at the point where the budget line is tangent to the indifference curve. So, consumer there is an equality ratio between the marginal utility, and price of x and marginal utility and price of y.

So, consumer allocates income. So, that the marginal utility per rupees spend on each good is same for all commodity purchase. So, like since there is a ratio is equal to ratio of one good is equal to another good. It can be said that the marginal utility spent on per rupees for each good is same for all the commodities purchase.

Till the time the equality is maintained, then this is fine. But when there is a disturbance in the equality or at any point of time. The ratio of marginal utility price of ONE good is greater than or smaller than the ratio marginal utility and the price of the other goods.

In this case, we can say that like in this case the ratio of marginal utility of x is greater than price of x is greater than the marginal utility of y than price of y the consumer will spend more on good x. And less on y, because he is getting more marginal utility by spending on x as compared to y.

The situation will again change, if the marginal utility and price of y is greater than the ratio of marginal utility and price of x. In this case the consumer will prefer to spend more on good y as compared to x, because the consumer is getting a higher level of satisfaction or higher level of utility by spending on good y.

Because the marginal utility, what he is getting by spending one additional rupee on it is giving a higher utility as compared to additional utility that he is getting from good x. So, if it equality, then the consumer is spending money in such a way because the marginal utility is getting that is equal.

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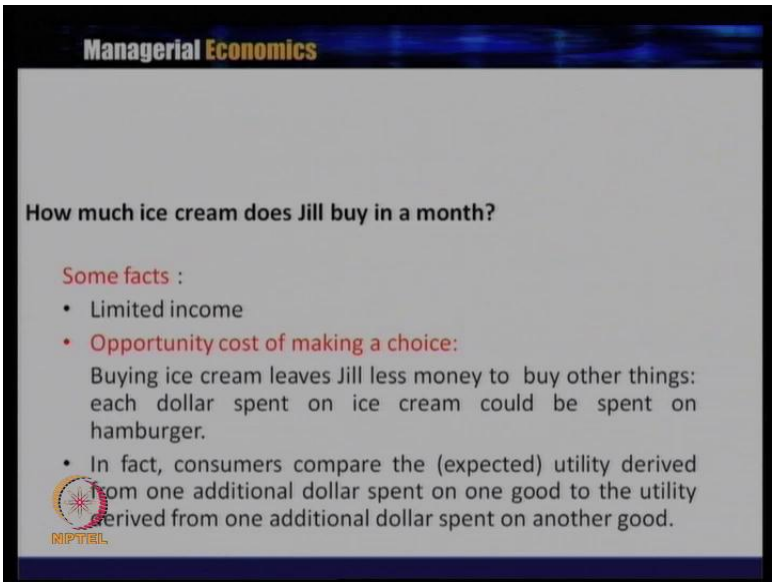

But, sometime there is a mismatch; the consumer always spends more money income, where they get a higher level of marginal utility. Now, we will take an example that how generally these choices are made, when it comes to the decision making in term of the marginal utility.

We will take a case of Jill that how much of ice cream does Jill by in a month. There are some facts, this is limited income. And there is also an opportunity cost involved of making a choice. Buying ice cream leaves Jill less money to buy other thing each dollar spent on ice cream could be spent on the hamburger.

So, how much ice cream Jill should buy it. There are few facts on this. He cannot buy unlimited, because there is limited income. And also, there is opportunity cost associated with it, whenever he is buying the ice cream, because the same dollar or the same money income spent on buying other goods like the case of the ham burger.

So, whether it is Jill or any other consumer, they always make a comparison before deciding on where they have to spend the money income. So, in this case, if it ice cream or it is the case of ham burger, Jill has to decide on the basis of the marginal utility. How much marginal utility he is generating? When he is spending money on the ice cream? Or spending money on the ham burger for example?

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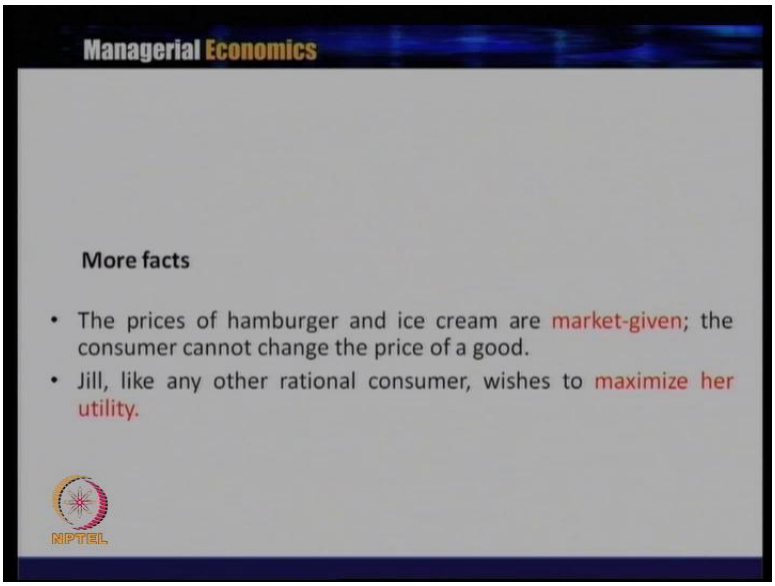

So, some more facts the price of hamburger, and ice creams are market given. The consumer cannot change the price of the goods. Jill, like any other rational consumer wishes to maximize her utility. So, prices are given, marketing are given consumer cannot change it. And Jill maximize her utility, because this is the general optimization problem for any rational consumer.

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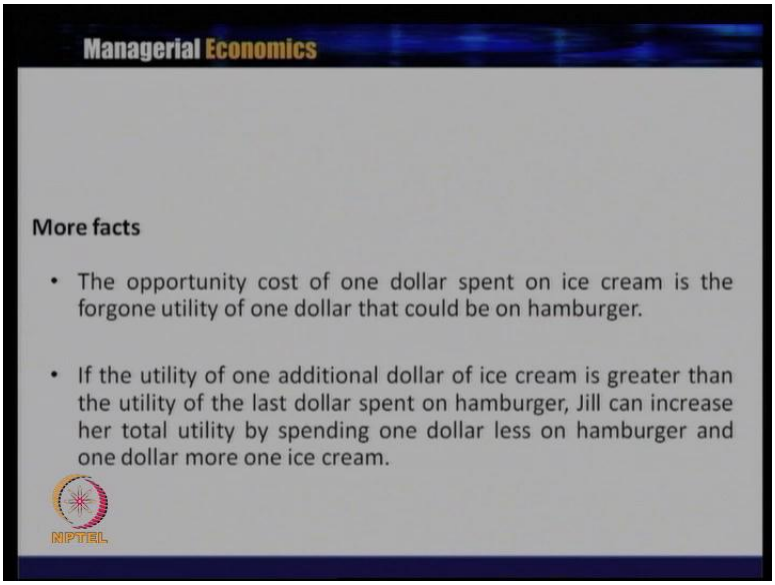

The opportunity cost of 1 dollar spent on ice cream is the forgone utility for 1 dollar that could be spent on the hamburger. Because what is the opportunity cost here, if he is

spending one dollar on ice cream. Then the opportunity cost of this dollar is to forgone the utility of 1 dollar that could be on hamburger.

So, if he is not spending on the ice cream. He could have got it on the, he could have bought a hamburger, if the utility of 1 additional dollar of ice cream is greater than the utility of the last dollar spent on hamburger. Jill can increase her total utility by spending 1 dollar less on ham burger and on dollar more on ice cream.

So, it is like, when he is getting more utility by spending additional dollar on ice cream rather than on ham burger. In his next consumption, what he will do is, he will reduce his consumption from ham burger. And he will spend more on ice cream, because he is getting a higher level of utility, if he is spending on ice cream.

So, here the decision rule is, when he is spending or when any consumer is spending on more unit of money. Whether it is in the form of dollar; in the form of the rupees; whatever the additional utility they are getting. And their decision always goes for the product, where they are getting a higher level of utility. And the same is happening in the case of Jill. Even if she is spending both on ice cream and hamburger, but if she is getting more utility on ice cream she will prefer to spend more on ice cream rather than the hamburger.

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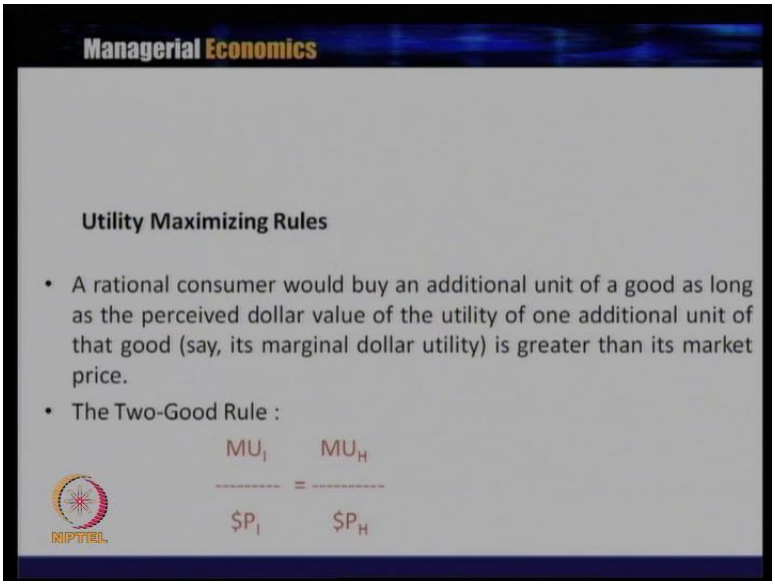

So, utility maximizing rule has to say, that there is a ratio of marginal utility of x and y. Similarly, if you take two-good here I and H; the two-good rule is the ratio of marginal utility and price of I. It should be equal to the ratio of marginal utility and price of H.

The rational consumer would buy an additional unit of good H. The perceive dollar value of utility of 1 additional unit of that good say, marginal utility is greater than its market price. Like till the time, the ratio is equal, the consumer is spending on both the goods, but when it comes to inequality as we discussed in before few minutes.

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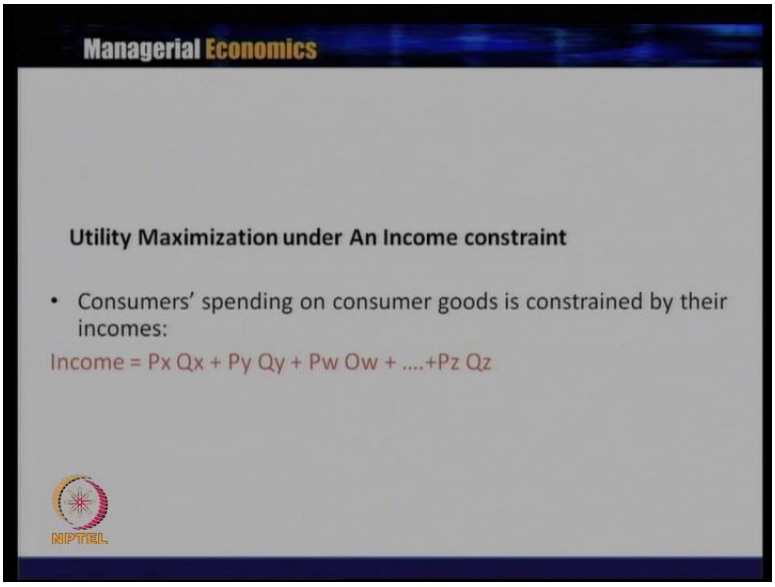

If there is an inequality, the consumer always spends more on the goods where they are getting higher level of utility. Now, we will see how the utility maximizes takes place under an income constraint. Consumer spending on consumer goods is constraint by their income like here.

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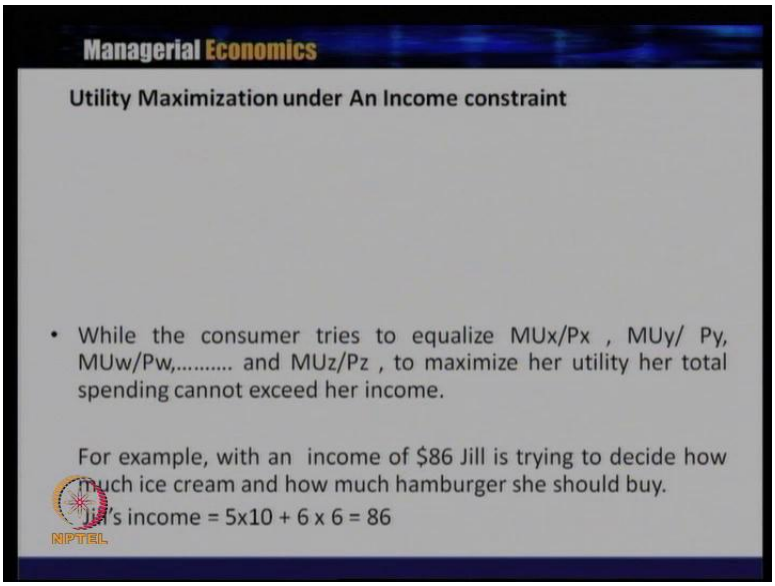

You can look at the budget line equation is, P x Q x plus P y Q y or P w or Q w or P z Q z and the income constraint or the budget constraint consist the price of the goods and the quantity of the goods. So, that what can be purchased with a fixed money income? So, in this case, even if the consumer tries to always equal the ratio of the marginal utility and the price of all the goods, they can spend equal amount of money on all the goods. But to maximize our total utility if it is a case of Jill, her total spending cannot exceed her income.

For example, with an income of 86 dollars, Jill is trying to decide how much hamburger she should buy. So, if Jill income is 86, then she can consume both the goods, may be ice cream and the hamburger. So, if it is 5 multiplied by 10, plus 6 multiplied by 6.Then it comes to 86 rupees. Now, we will see how we get this number 5 10 6 and 6, which one is the unit and which one is the price, and what is the requirement for here? We should know what the price of ice cream and hamburger is. We should know what the money income that Jill is having is.

So, we know that the Jill is having the income equal to 86 dollar. Now we will see with a help of 86 dollars, how much unit of ice cream or how much unit of hamburger Jill can buy. With this income, we see whether she is reaching the optimization or optimal consumption or not.

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2	45	10	4.5	30	6	5
3	35	10	3.5	20	6	3.3
4	20	10	2	15	6	2.5
5	10	10	1	10	6	1.7
6	7	10	0.7	6	6	1
7	3	10	0.3	3	6	0.5
8	0	10	0	0	6	0

So, this is the example of the quantity price of both the ice cream and hamburger. So, the first column gives us the quantity. The second column gives us the marginal utility of ice cream. The third column gives us the price of ice cream. The fourth column gives us the ratio of marginal utility and price of ice cream. The fifth column gives us the marginal utility of hamburger. The sixth column gives us the price of hamburger. And the last column gives us the ratio of the marginal utility of hamburger and price of hamburger.

Now if the price is 10 for ice cream and 6 for hamburger, then how many units of ice cream Jill should buy and how many unit of hamburger she should buy? What is the ratio? If you remember the equality condition, optimal consumption is one where the marginal utility and price of both the goods has to be equal. So, in this case we are getting the marginal utility and price of good is equal, either at the unit 5, where the price is 10 rupees, may be the price of ice cream is 10 dollars and price of hamburger is 6 dollars.

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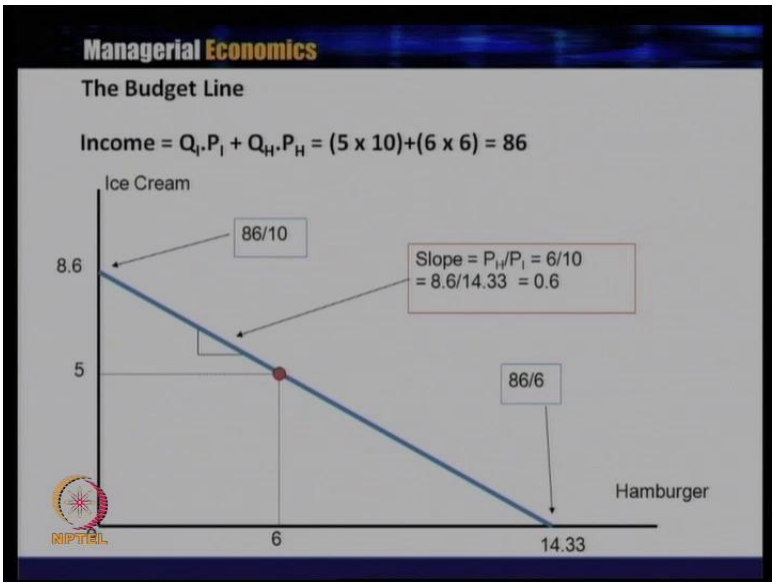

Now looking at this, if you plot it in a budget line, when the entire 86 rupees is getting spent on ice cream, then the value of y is 8.6 because price of ice cream is 10 dollar. And with the help of 86 dollar, the consumer can only buy 8.6 units of ice cream. And if the consumer is buying hamburger only, then in this case, the consumer can buy 14.33 units of hamburger. Hence, the price of the hamburger is fixed at 6 rupees. So, there are 2 extremes; one extreme 8.6, the other extreme 14.33.

And, what is the optimal consumption? The optimal consumption is when the consumer is buying 5 unit of ice cream and 6 unit of hamburger. So, price of ice cream is 10 dollars, it comes to 5 units, it comes to 50 dollars and price of hamburger is 6 dollars, when the consumer is spending 6 units on hamburger that gives us the 36 dollars. So, 50 plus 36, that gives us the 86 dollar. And what is slope here? The slope here is 6 by 10. Because 6 is the price of the hamburger and 10 is the price of ice cream, and that comes to 0.6 as the slope.

So, if you look at now, what is the optimal consumption? The optimal consumption is 5 unit of ice cream and 6 unit of hamburger, which gives the level of satisfaction to Jill, and also this fits within the income that is 86 dollar.

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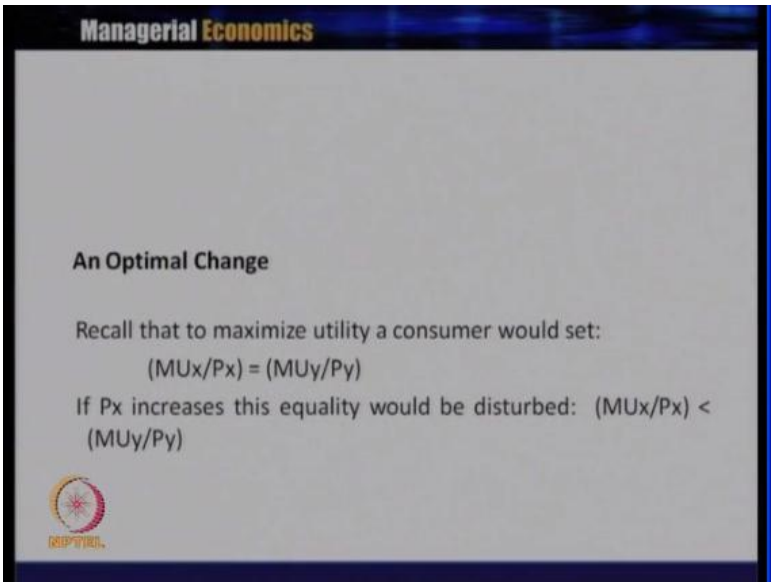

So, if you recall the utility maximize rule. This is also the ratio of the one goods as compare to the ratio of the other goods. And the price of x increases, this equality would be disturbed. It is not only the utility will disturb this equality. Also when there is a change in the price that will also disturb the equality. So, M U x P x will be less than M U y P U y, if there is a increase in the price of x. And similar thing also happen, if there is a change in the price of y.

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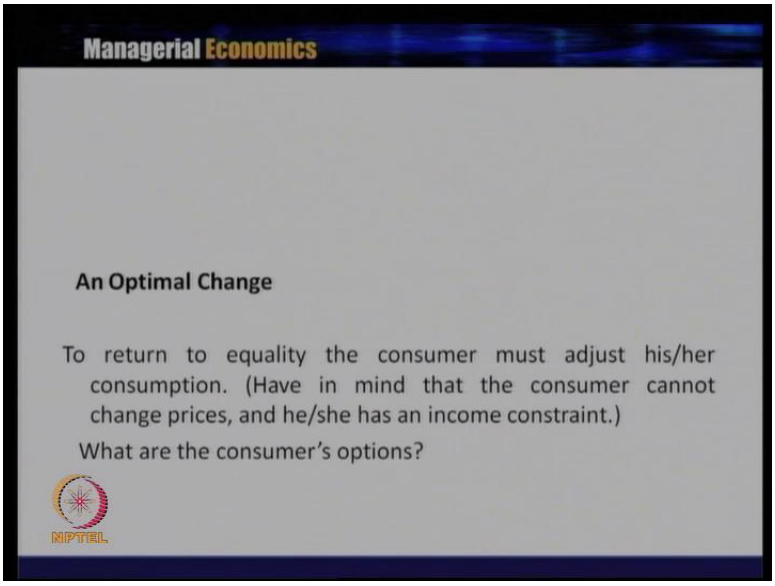

So, to return to equality the consumer must adjust his or her consumption, having in mind that the consumer cannot change the price, if he or she has an income constraint. Then what are the consumer options? If there is a mismatch to reach to the optimal consumption, the consumer must adjust to his or her consumption. Here we need to remember that, the consumer cannot change the price, the consumer cannot change the income available to him.

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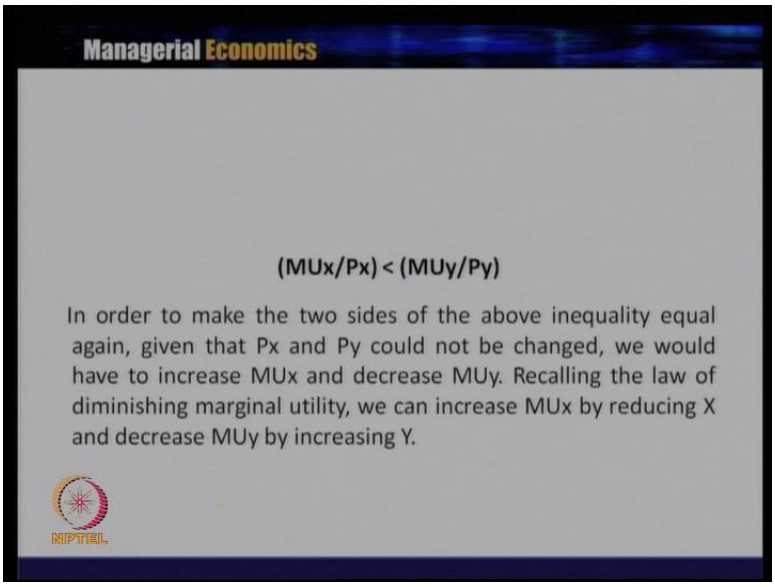

Now, what are the consumer options? In order to make the two sides of the above inequality equal again, given that P x P y could not be changed, we could have to increase M U x and decrease M U y. Recalling the law of diminishing marginal utility, we can increase M U x by reducing X and we can decrease M U y by increasing Y.

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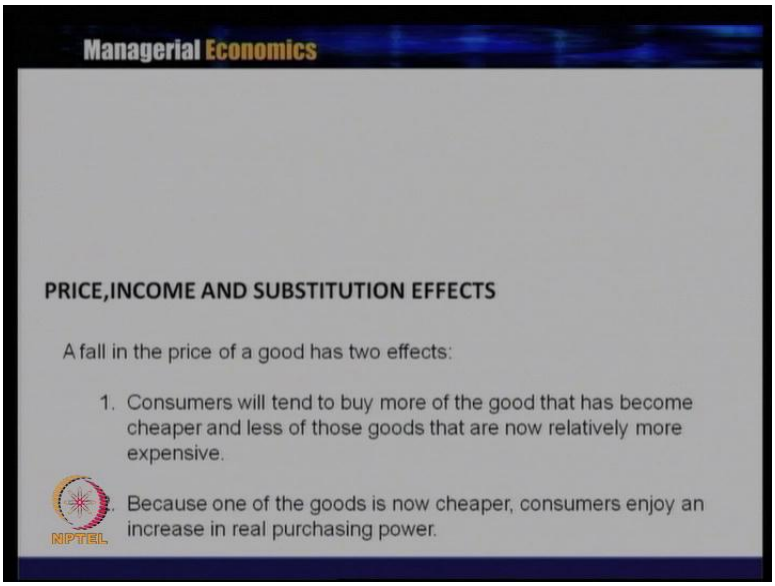

Then we will come to what happens when there is a change in the price? What it leads to? Because if you remember the budget line shifts, whether it also shifts the consumer equilibrium, whether it also shifts the consumer preferences, with the change in the budget line, that we will analyze through the price income and the substitution effect.

So, if decrease or increase in price of a good has two effects. One consumer will tend to buy more of the good that has become cheaper and less of those goods that are now relatively more expensive. So, in case of decrease in the price, consumer will tend to buy more of the goods that has become cheaper, and less of those goods that has become relatively more expensive.

Because one of the goods is cheaper, consumer enjoys the increase in the real purchasing power. If you remember the shift in the budget line, if price of x is decreasing, that leads to the shift in the budget line in the horizontal axis. Because with the same money income, now purchasing power of the consumer has increased and the consumer is buying more amount of x. So, any change in the price has two effect; one the consumer buy more of these goods where the price has gone down, and less of those goods which become expensive now.

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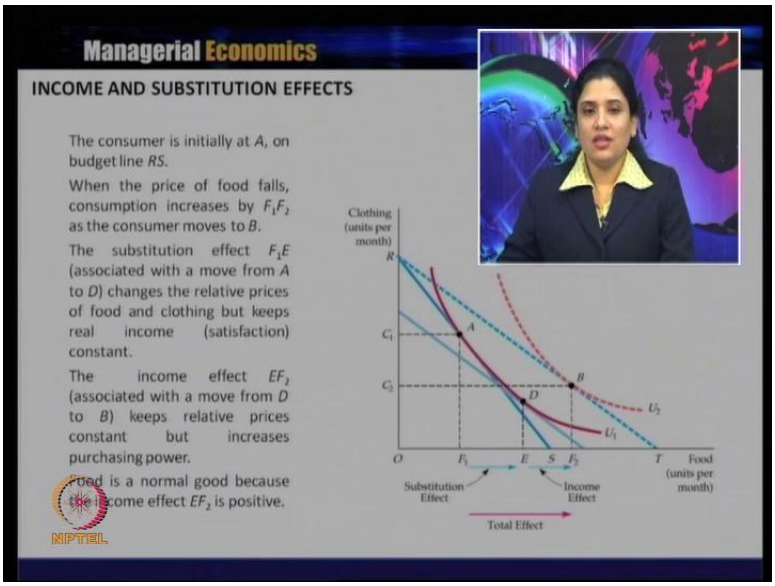

Now, we will see we will analyze the change in the price, and we will see that how the effect of change in the price is equal to the substitution effect, income effect and equal the price effect is equal to substitution effect and income effect.

So, if you look at the graph, the consumer is initially at A on the budget line R S. Now, if you are considering food on the x axis, clothing on the y axis and the consumption basket consist of only food and clothing. The consumer is initially at a point A, at the budget line R S. When the price of food decreases, then the budget line shift to the right. Now, how the budget lines shift to the right? Because there is a decrease in the price of food, that leads to the purchasing power of the consumer. And by which they can buy more of the food now that is the reason the budget line will shift to R T. So, when the price of good falls, consumer increases by F 1 F 2 as the consumer moves to B. Now, what is the increase in the quantity that is F 1 and F 2?

Now, what are the options the consumer with a new budget line? The consumer moves to a higher budget line, and ideally the consumer should consume more. Now, we will see that how this consumption of more of x will lead to some adjustment in the purchasing power of the consumer, some adjustment in purchasing pattern of the consumer.

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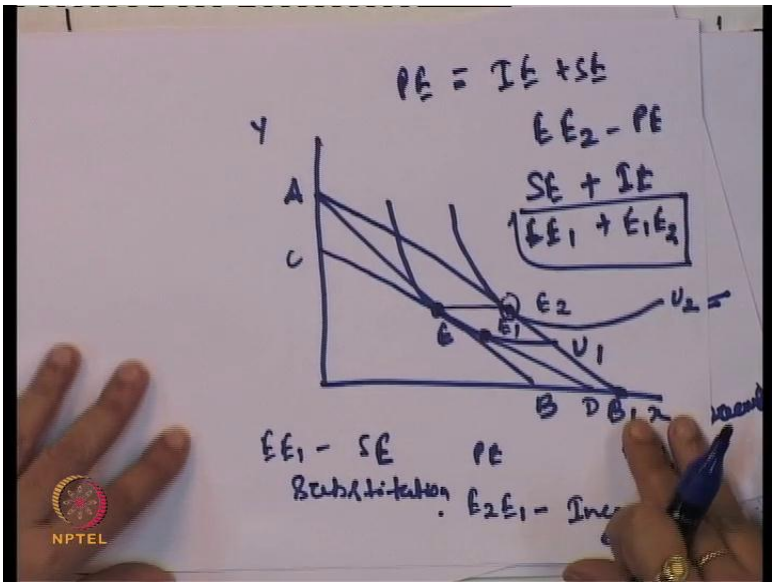

So, initially the budget line is A B, and the consumer was suppose this is the indifference curve the consumer was at equilibrium at this point, may be suppose this is E. Now if you are considering here x and here y, price of x decreases. When there is a decrease in the price of x that leads to change in the budget line from A B to A B 1. Because now with the help of reduced price, the consumer can buy more of x. with a new budget line the consumer can achieve or the consumer can choose a combination at the higher indifference curve U 2 because U 2 gives as a higher level of satisfaction.

Let us consider this point as E 2. Now what the consumer will try to do if the consumer is still want the same level of satisfaction? Then in that case we have to draw a parallel line by compensated demand curve and what is this compensated demand curve? This compensated demand curve is reducing the same amount of income what has or what has been increased by the real purchasing power. So, by this now the budget line shift to C D and which is again at the consumer can prefer a combination or the consumer can be equilibrium at this point E 1.

So, this movement from E to E 2, this is because of price effect. The movement from E 2 to E 1, this is because of the income effect. Because there is a reduction in the income effect by the compensated demand curve and this movement from E 1 to E 2 is the substitution effect.

So, now how this entire process of income substitution and price effect were? Initially the consumer is at equilibrium at this point E, price of x decreases, the consumer moves to a new budget line that is A B to A B 1. With a new budget constraint, with a new income constraint, consumer can consume a combination or choose a combination on a higher difference curve U 2. And with this, the consumer moves to new consumer equilibrium point E 2. The movement from E 2 is price effect because this change is due to change in the price.

Now, to bring back the consumer to the original satisfaction level, there is a reduction in the money income by the compensated amount by which there is an increase in the real purchasing power. That leads to the shift in the budget line, a parallel shift in the budget line from A B 1 to C D.

With a new budget line, still the consumer can choose a combination which is equal to E 1 and this is the new equilibrium for the consumer. So, the movement from E 2 to E 1 is due to change in the income that is known as the income effect. And movement from E 2 to E 1 is because of the substitution has been done. Because there are few substitutions being done and that is the reason the movement is from E to E 1.That is the reason it is known as the substitution effect and that is the price effect that is E 2, is always the combination of the substitution effect and income effect.

Now what is Substitution effect? Substitution effect is E E 1 and income effect is E 1 E 2. So, price effect is always a combination of income effect plus substitution effect. Let us go back to the graph what we are showing in the slide again. So, initially the consumer is at point A, and when the price of food decreases consumption increases by F 1 F 2 as the consumer moves to point B. And it is on a higher difference curve U 2 .The substitution effect F 1 E associated with a move from A to D that is change in the relative prices of food and clothing, but keeps the real income the satisfaction constraint.

Like what we did in case of the graph, that is the movement from E 2 to E 1. Because the satisfaction has to keep constraint, and that is the reason the real income has to be constraint, and that is the reason there is a decrease in the budget line by the amount by which there is an increase in the real purchasing power.

The income effect is E F 2 associated with a move from D to B keeps the relative price constraint, but increase in the purchasing power. Food is the normal good; because the

income effect E F 2 is positive, and if it is negative, then this is an inferior good, because the logic here is that for the normal goods always the income increases, when always the consumption increases whenever there is an increase in the income.

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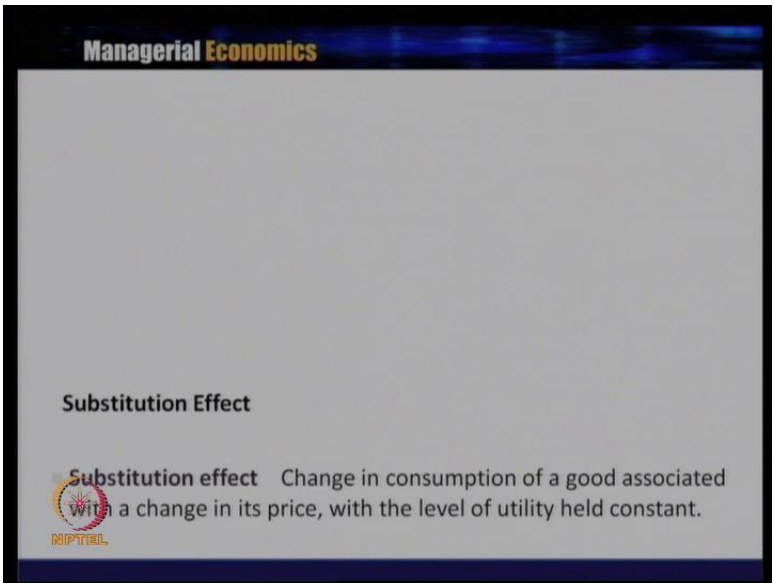

So, substitution effect is the change in the consumption of goods associated with the change in its price with the level of utility held constraint.

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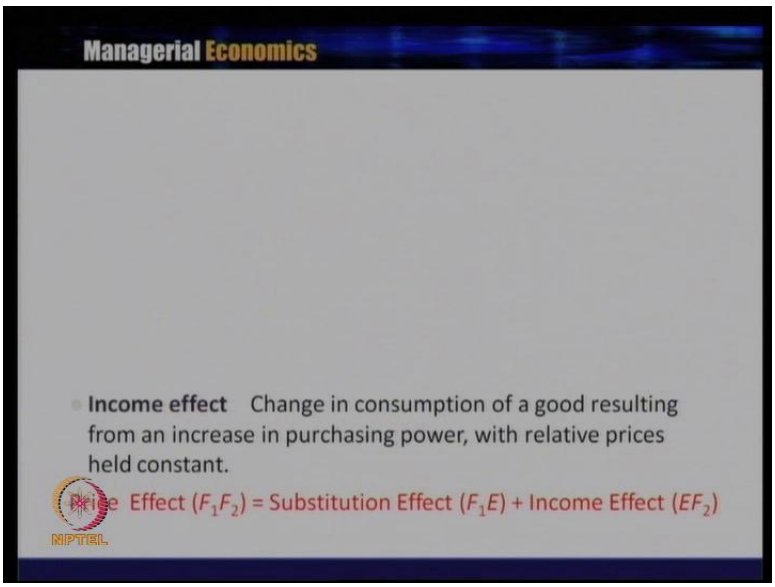

And, income effect is the change in the consumption of good resulting from an increase in the purchasing power with relative price held constraint. So, in the previous class, the

price effect is F 1 F 2, which is equal to the substitution effect that F 1 E and income effect that is E F 2.

So, let us take a numerical to understand the concept of price effect, income effect and the substitution effect. So, we have information about the price of x and y, we have information about the quantity of x and y, we have information about the income, and also we have information about the utility. What the consumer receives from the consumer specific combination of both x and y.

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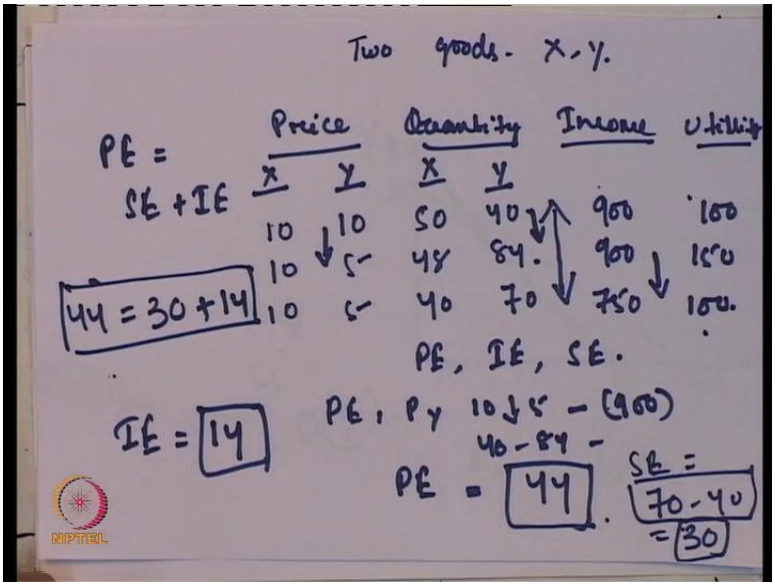

Suppose, we have taken the case of two goods, that is x and y, which is a part of the consumption basket. So, the first one is price, second one is quantity, then income, then utility. So, price again we have price of x, price of y, quantity of x, quantity of y. Then income is same for both the goods and utility is again same.

So, in the first case, price of x is 10, price of x is 10, price of x is 10, price of y is 10, price of y is 5, price of y is 5, then quantity of x is 50, quantity of y is 40,quantity of x is 48, quantity of y is 84, quantity of x is 40, quantity of y is 70, income is equal to 900, income is equal to 900, income is equal to 750, utility is 100, utility is 1 50, utility is 100.

Now, we will find out the price effect, we will find out the income effect, and we will find out the substitution effect. Now, how we will find out the price effect? When the price of y decreases from 10 to 5, holding the income constraint, the quantity demanded

of y increases from 40 to 84. So, price of y decreases from 10 to 5, we have to keep the income constraint, the quantity of y increases from 40 to 84. What is the price effect? The price effect is the change in the quantity demanded, when there is a change in the price of the goods.

So, in this case the price of the goods is changing from 10 to 5, which leads to increase in the consumption of y from 40 to 84, even if the income constraint there is an increase in the purchasing power of the consumer, because of the decrease in the price of y and that is the reason the price effect equals to 44.

Now, we will see how we can find out the income effect and the substitution effect. Now substitution effect, if you remember both the utility has to be same, even if there is a decrease in the income. Like in the graph, even if you draw a compensated budget line from the previous budget line to the original budget line. So, the utility level has to remain constraint. The next point also was on the same indifference curve. So, in this case hundred is the utility. Keeping the utility level constraint, the difference between the quantity y in both these cases will give us the substitution effect.

So, substitution effect is equal to 70 minus 40, which is equal to 30. So, what is the logic for calculating this substitution effect? The utility has to remain constraint and what is the change in the quantity of y? So, in the initial case if you remember the graph, the point where you move from E to E 1, both of the satisfaction level is same.

But there is a change in the quantity of y and that same change is represented here between 40 and 70. And that is the reason the substitution effect is 30. Now, we will find out the income effect. How to find out the income effect is, when there is a change in the income what is the change in the quantity demanded.

So, here the income decreases from 900 to 750. And the consumption of y decreases from 84 to 70 which are equal to 14. Now we will check whether the price effect is equal to the substitution effect or not. So, price effect is substitution effect plus income effect.

So, in this case price effect is 44 which is equal to 30, which is substitution effect and 14 which is equal to the income effect that comes to the equality between the summation of price effect, substitution effect and income effect; which is equal to the price effect. And here the nature of the good is normal, because the income effect is positive.

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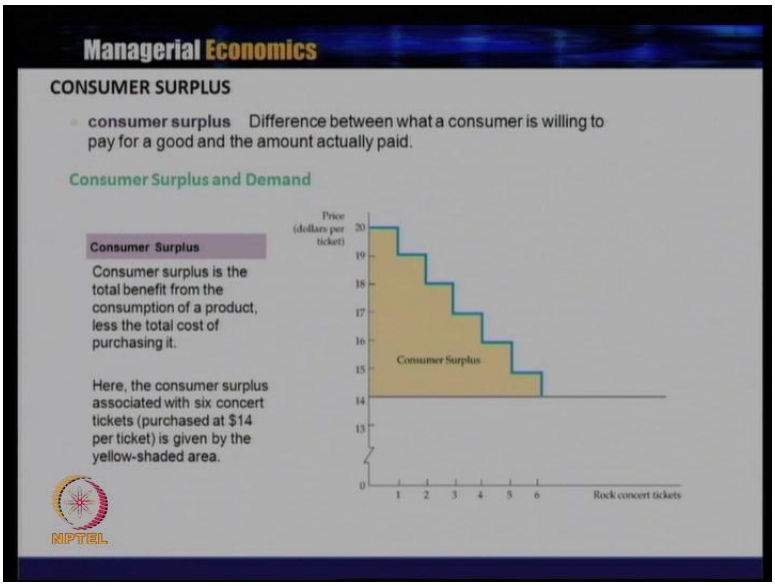

Next, we will introduce the concept of consumer surplus. This actually measures what the consumer is willing to pay for the good and the amount actually paid. So, how the consumer surplus and demand is related consumer surplus is if you look at it, it is derived from the market demand.

Consumer surplus is the total benefit from the consumption of a product less the total cost of purchasing it. So, here the consumer associated with 6, the concert tickets purchased at 14 per ticket is given by the yellow shaded area. So, like if you look at, this is the price, this is the quantity, this is the demand curve.

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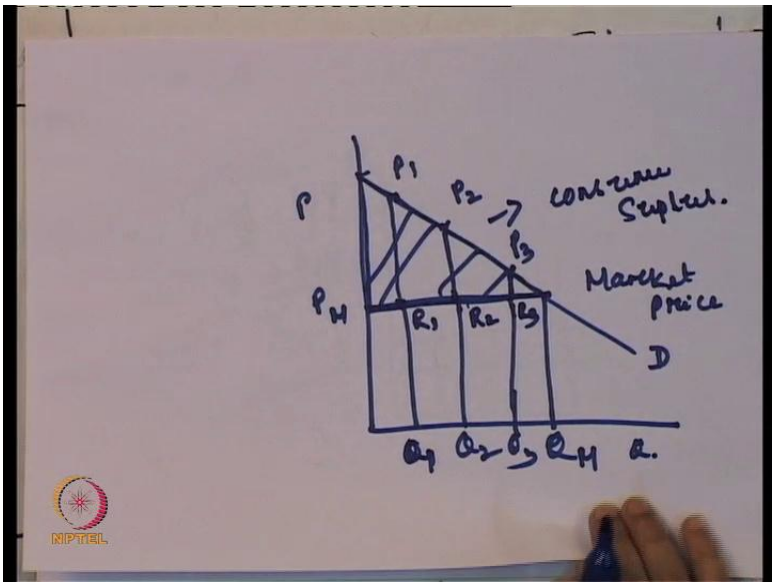

This is the market price which is equal to P M, this is Q M. So, this is Q 1, this is Q 2 this is Q 3. Now to purchase this Q 1, amount of the quantity the consumer is ready to pay P 1 to purchase this Q 2.

The purchase is the consumer is ready to pay P 2 and the purchase Q 3. the consumer is ready to pay P 3 , but since, P M is the market price, the consumer is only paying irrespective of whatever quantity they are buying whether Q 1, whether Q 2, whether Q 3. And because of this, the consumer is getting some surplus, because what actually he is paying and he is ready to pay. There is a difference between this; he is ready to pay P 1, but he is paying R 1. He is ready to pay P 2 in this case, but he is paying R 2. He is ready to pay P 3, but he is paying R 3.

So, this is the amount of the benefit. This is the amount of the surplus what the consumer is getting, and this is known as the consumer surplus. So, consumer surplus is nothing but what the consumer is actually ready to pay and actually he is paying in the form of the market price that gives us the consumer surplus.

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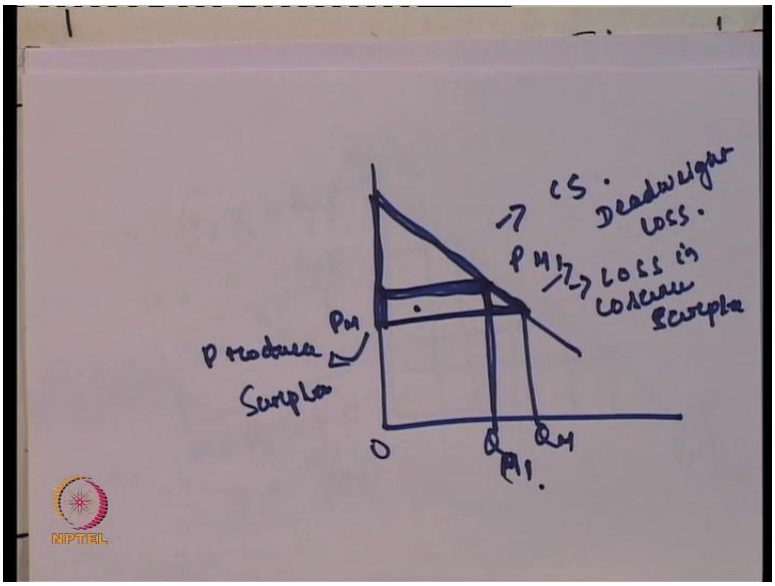

Now, what happens when there is a decrease in the market price? If you take in the previous example, this is our market price, which is equal to P M, and this is the total consumer surplus area. Now, suppose the market price is increased from P M to Q M. Now what would be this? With this, the quantity demanded in the market will be Q M 1. So, earlier the consumer surplus was this much, with the increase in the market price. The consumer surplus is the small triangle, because as market price has increased from P M to P M 1.

So, this area is the loss in the consumer surplus due to change in the price. So, this loss in the consumer has two parts; one parts which goes directly to the producer, and how it directly goes to the producer, because with the increase in the price they get in the form of the revenue. And this is part of the producer surplus; however, this small triangle this neither goes to the consumer account nor goes to the producer account and that is the reason this is known as the dead weight loss.

So, when there is an increase in the market price, there is an increase in the market price from P M to P M 1, there is a decrease in the quantity demanded. The market demand is Q M 1. And with the increase in the market price, there is loss in the consumer surplus. There is a decrease in the consumer surplus area, and the new consumer surplus area is the small triangle. The loss in the consumer surplus area has 2 parts; one is producer

surplus which goes directly to the producer in term of increase in the revenue, but the small triangle is one where it neither goes to the consumer.

Because the consumer has reduced its consumption from Q M to Q M 1, nor it is getting sold by the producer and that is the reason, this is known as the dead weight loss. It neither goes to the consumer loss, nor does it go to the producer account.

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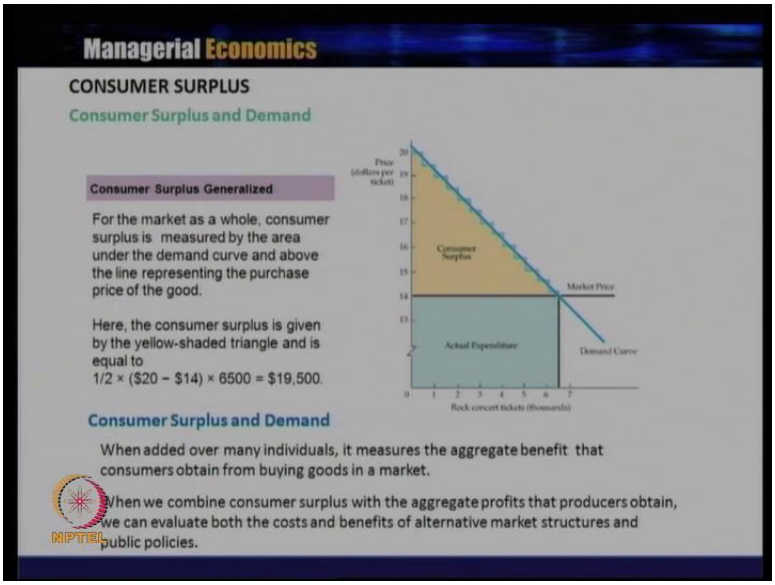

So, consumer surplus is nothing, but the change in the nothing, but what consumer is actually paying and what he is willing to pay for the product. And the consumer surplus changes when there is a increase in the market price and the loss in the surplus has two; one which goes directly to the producer account in term of increase in the revenue.

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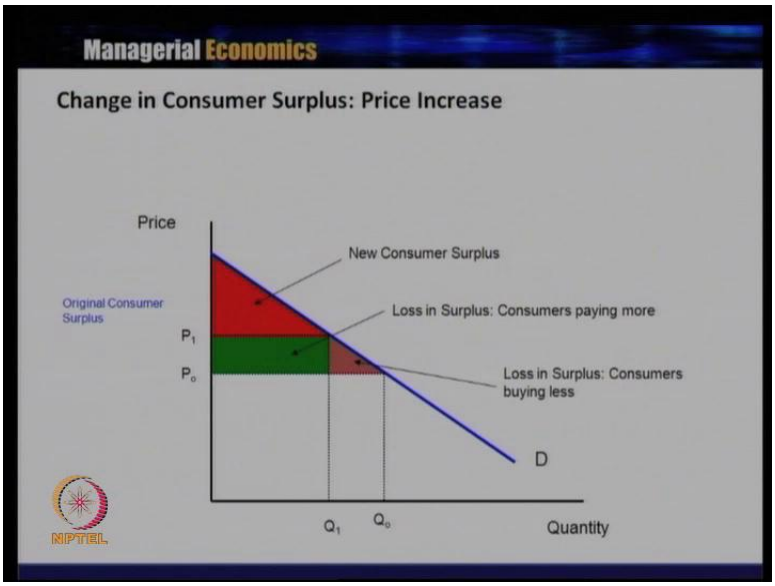

And second is the dead weight loss, because it neither goes to the producer. Because it is not getting sold and neither it comes to the consumer, because consumer is also not paying for them. So, in this particular graph, because a price increase to P 1, the red triangle is the new consumer surplus area, the green one is the producer surplus, that is consumer paying more and the orange triangle small triangle is the dead weight loss. Because it neither goes to the consumer account nor it goes to the producer account.

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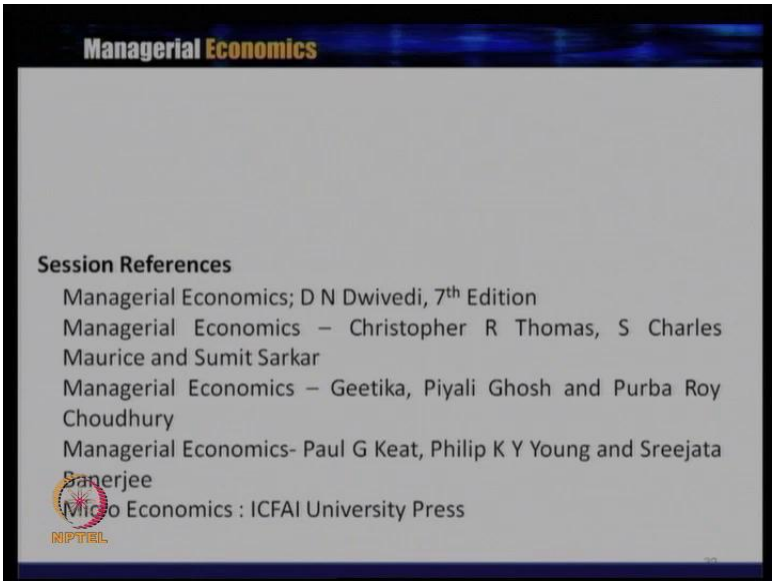

These are the session references that are being followed for this typical session.