

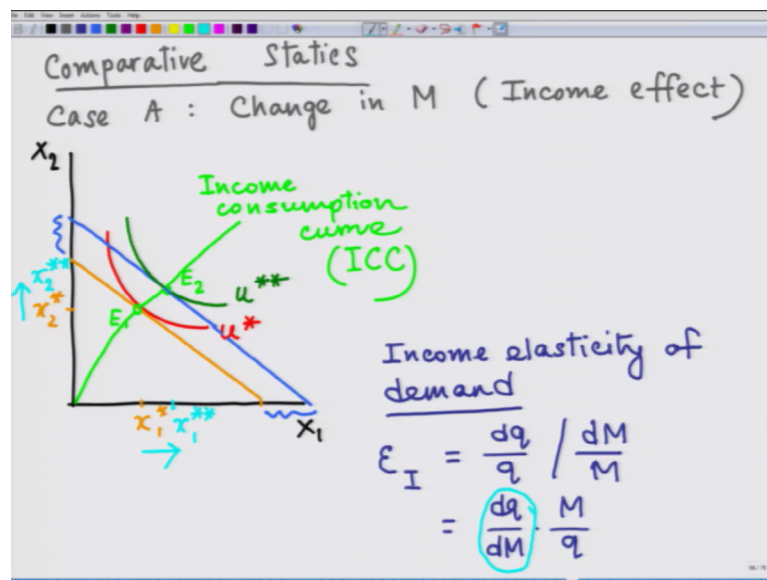
Microeconomics: Theory & Applications
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Lecture – 15
Income Consumption Curve & Related Issues

Hello welcome back to the lecture series on Microeconomics. Let us continue with the discussion of comparative statics in the context of a consumer's equilibrium. Last time, we have seen how consumption demand for commodities one and two are going to change when there is a change in money income M . We have seen if there is an increase in money income M , then the budget line shifts upward parallel. And in general cases, there will be an increase in consumption of both the commodities one and two, but the question remains. Is it the case? Always the answer is no.

Now, to discuss these different cases of responsiveness of commodities one and two with respect to change in income. Let us consider another concept called income elasticity of demand.

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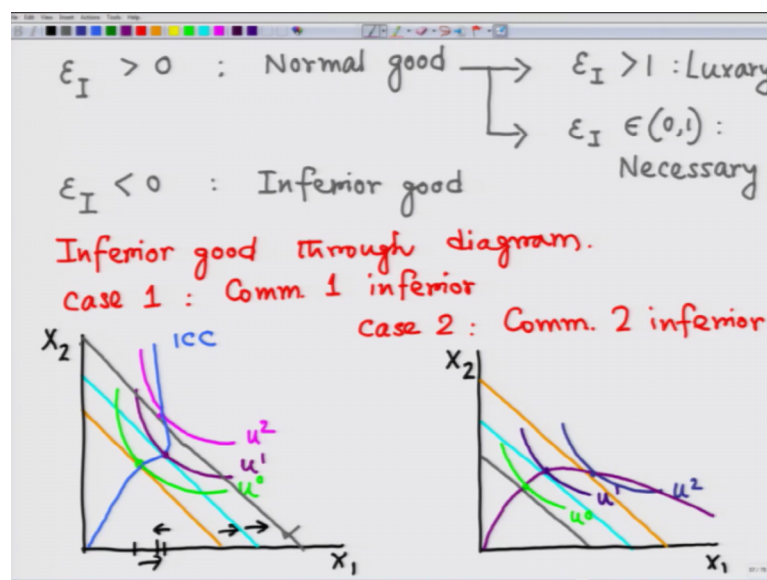


So, now we are going to introduce this concept of just to remind you. Let us focus on the graph that we have seen earlier. So, this income consumption curve or income offer curve line is basically a locus of all the equilibrium points with respect to varying income level, but with constant prices.

So, now we can introduce this formula of epsilon I demand elasticity with respect to income as the proportional change in quantity demanded divided by proportional change in money income here, q can be either X 1 or X 2. We can rewrite this as this expression. Now, note this expression this dq dM can take any value right. So, these derivative measures the responsiveness of quantity demanded with respect to a change in money income. Now this can take any sign. So, we can see that income elasticity of demand actually depends on this particular derivative value.

We are going to now explore some cases; first we are going to distinguish between two types of commodities with respect to their income elasticity of demand value.

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If epsilon I takes positive value; that means, that with respect to change in income, we experience increase in demand for the commodity. In that case, we call that good to be a normal good. Now a positive number can be of two types right. It can be greater than equal to 0 or it can be a fraction. So, we can again make two categories epsilon I greater than equal to 1. In that case, we call that good to be a luxury good and epsilon I belonging epsilon I belongs to this interval 0 1. In that case, we call this as a necessity or necessary good.

Now, if epsilon I takes negative value we call that as an inferior good. Inferior goods are difficult to get, but you know some goods can be inferior in different context; we can talk about this you know in short while. So, now, we are going to introduce inferior goods

through diagrams. So, if one of the goods to be consumed is inferior, then what will happen to the indifference curve diagram? There can be two different cases of course, commodity 1 can be inferior or there can be a case 2 where the commodity 2 is inferior.

Now, let us look at a diagram. So, if commodity 1 is inferior; that means, that after some level of consumption of commodity, one the consumer thinks that the good is inferior. And with respect to increase in income he or she decides to consume less of that commodity. So, let us first start with the consumer's equilibrium.

Let us draw the budget line that is the initial budget line to start with. If there is an increase in money income, then we know that the budget line will shift upward parallelly. And now the consumer's equilibrium is to be found between at the tangency point between the budget line and the indifference curve. So, this is the initial utility level say u_1 and this is the initial point.

Now, there can be another tangency point between the indifference curve u_1 and this budget line. We can have another round of income increase and in that case again, we see a parallel movement in the budget line. And now if I assume that commodity one is an inferior good, then I assume that commodity one's consumption to fall with respect to this new budget line. So, now, here I introduce an indifference curve which creates the tangency with the current budget line in such a way that the consumer equilibrium gives a lower level of X_1 consumption. So, here you can see that the initial level of X_1 consumption was here.

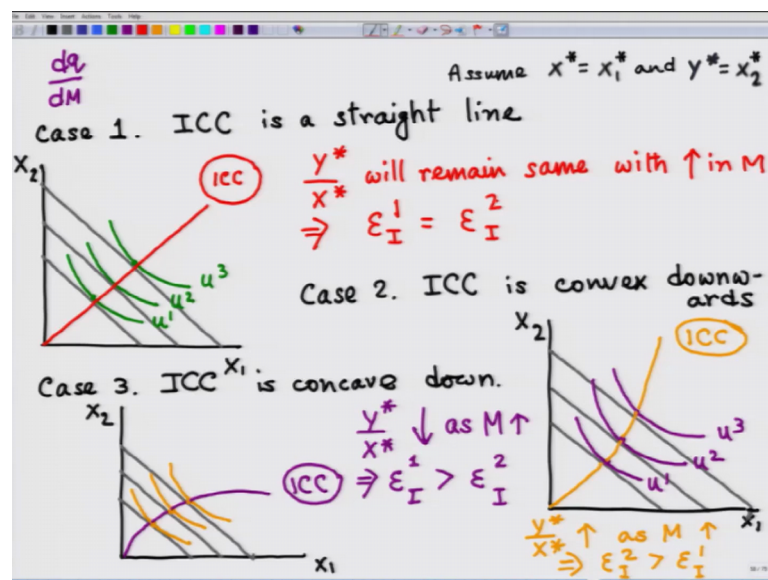
Now, after the first round of income increase the consumption of X_1 increased to this point. So, you can see after the second round of income increase the consumption of commodity one has gone down here. So, in that case, we can see after some point the X_1 the commodity one has become an inferior good and in that case the income consumption curve, we will first rise. But then, it will start bending backwards like this. Now let us see the case where commodity 2 becomes inferior good. Again we draw the diagram.

So, we have rounds and rounds of income increase. So, we start with a low level of income here, then we increase the income, then we income. We then we increase the income again to this point. So, if commodity 2 is inferior then; that means, that initially there will be a rise in consumption of community 2, but with extra income, there will be

a fall to be noticed in the consumption of commodity 2. So, let us start with the consumers equilibrium here. Then let us say, we have the tangency point noticed here and then finally, let us have another tangency point.

This time such that that a tangency the commodity consumption of commodity 2 has gone down. So, if we join the in these equilibrium points, then we can get an income consumption curve something like this. So, it is again bending backwards, but destroying with respect to the X axis or commodity 1's axis. Now, we move to other cases where we have the positive income elasticity values.

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So, if we have positive income elasticity of demand, then the slope that we have seen before $\frac{dy}{dx}$ can take any value; it can be a fraction, it can be more than 1 and many possibilities are there. So, now, let us see what different sort of income consumption curve shapes can arise due to different possibilities. We will start with diagrams again: first case is ICC is a straight line. So, in that case, we have shifts in budget lines, increase in money income. And now we say that we obtain the tangency points with indifference curve in such a manner that the tangency points lie on a straight line.

So, if we join, then we get a straight line ICC. So, we can assume if we observe a straight line ICC then; that means, that optimum level of Y consumption and the optimum level of X consumption the ratio of them will not change. So, that implies that income elasticity of both the commodities are actually same.

Now, let us talk about case number 2 where ICC is convex downwards. In that case, let us have this diagram. So, we have this budget lines one after the other, all parallel to each other. And then we have the tangencies between the indifference curves and the budget lines such a manner that the equilibrium points lie on a curve with increasing slope.

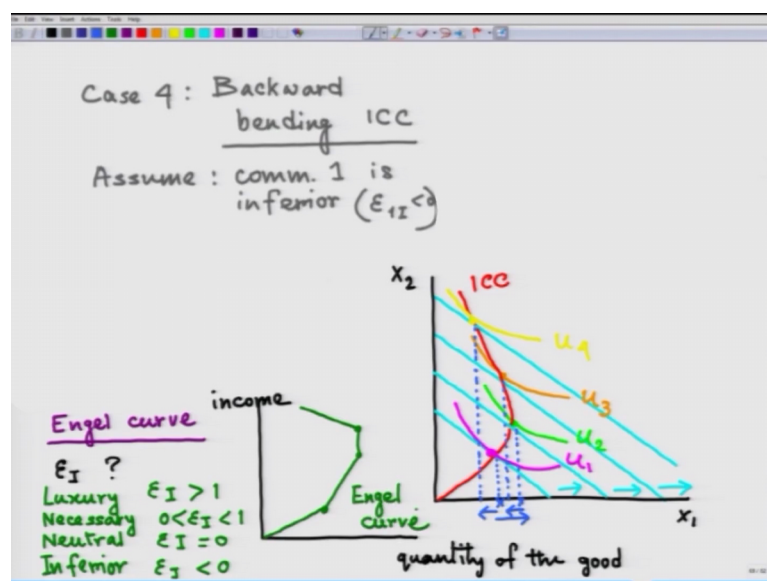
So, if I join them, it is going to be like an upward sloping curve. Now, what we will guarantee that kind of a shape; so, in this case we observe that the ratio of optimal consumption of Y and optimal consumption X is increasing as money income increases. So, this has this implication that ϵ_Y means income elasticity of demand of commodity Y is greater than the income elasticity of demand of commodity X. Now let us go to talk about case number 3, ICC is concave downwards. So, in that case what will be the diagram looking like the diagram let us draw.

Again the budget lines and then we have the indifference curves. Now this time the indifference curves will make tendencies with these budget lines in such a way that these tangency points, we will lie on a concave curve and that can be found like you know joining these points with origin. And in this case, ICC will be of this shape. When is that possible? That will now a concave to origin ICC means that the ratio of optimal consumption of Y and optimal consumption of X is falling as M increases. So, this is possible when this income elasticity of demand of commodity X actually, we can write you know 1 is greater than 2. So, now I am going to change some notations here. So, it will be 2, this will be 1 and now going to write 1 to 2 sorry for the confusion.

So, an income consumption curve traces the utility maximizing combinations of 2 goods as income of a consumer changes. Now we are going to study the last case and it is the interesting case of inferior commodity. If we are dealing with commodities with negative income elasticity of demand, how that is going to impact the shape of the income consumption curve? I must say that in reality, there are very few cases where you can actually observe inferior commodities, but there can be some very special cases. So, theoretically at least the case of inferior commodity and the corresponding shape of income consumption curve is interesting.

So, now let us go to draw the diagram for the inferior good; we are going to assume that X₁ is the inferior commodity with negative income elasticity.

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So, if we assume, so, then we get a backward bending. One may ask what will happen if we assume x_2 as the inferior commodity? It will just become forward bending, nothing else will change. So, it does not matter. So, here assume your commodity 1 is inferior; that means, ϵ_{1I} is negative. Now let us draw the diagram. This is slightly complicated one and in this case as it is slightly complicated, I will prefer to draw the complete diagram. So, I will start with you know various income levels. So, let us draw the initial budget line. Let us give the consumer some extra money. So, they will be parallel shift.

Let us give the consumer some extra money; there will be again parallel shift. Let us again give the consumer some extra bit of money, there will be parallel shift. So, as income increases, the budget line shifts upward parallelly. Now we are going to introduce the indifference curves right.

So, let us have the initial utility level. The consumer is maximizing utility at this point. Now we are talking about backward bending indifference curve ICC so; that means, that we have to start from origin as income increases at low level of income the consumption of both the commodities increases. But then after some critical level of consumption of commodity 1, there is a fall noticed of consumption of commodity 1 as we give the consumer more and more income.

So, you get a shape like this. So, basically we are talking about tangencies like this. We start with the level of X_1 consumption here, then there is income increase. First it rises up to this point, then with further income changes. Further income increases, it starts to drop. So, it first rose from here to here, then there is a fall from here to there and again with another round of income increase there is a further drop in the consumption of commodity 1 because commodity 1 is an inferior good. Now what can be an example of an inferior good? In reality, they are very few that exist, but one can think about some unhealthy foods which are cheap foods, fast foods. You in the case of western world, you can think hamburger as one of the inferior commodity.

Now, we are not going to you know detail you know what makes hamburger and inferior good. Let us just take to the example. Let us move on to some other interesting issues, as here we have seen with income change commodity demand also change we can relate these 2 through a concept called Engel curve. So, like in the case of price consumption curve as we have seen we can trace the individual's demand function in the case of income consumption curve. We can also trace what is known as Engel curve an Engel curve basically is a relationship between income of the household or the consumer and the quantity of a commodity being consumed. So, if I want to draw, we can draw it like this.

So, let us draw Engel curve. So, here along the X axis we plot the quantity of the good consumed and then along the vertical axis or Y axis we are measuring income. So, now, for different values of income elasticity of demand which we do not know a priori Engel curve can take various shapes. And let us going to inspect what sort of interesting cases can emerge. Now we are going to first assume that the good that we are dealing with is the luxury item. So, for luxury item we already know that the income elasticity demand, we will be greater than one. So, in that case the Engel curve we are straight line like this. It is can it can also be concave to the X axis.

Now, let us assume that we are dealing with necessary goods in that case it is going to be the income elasticity of demand is going to be a fraction in that case the slope of this line is going to be more steep and we are going to have something like this. Now there is also neutral goods for which the income elasticity of demand will be 0. So, for that, so there is an inflection point. So, here for the neutral goods, there can be stretch in the Engel curve which will be parallel to the income axis and then finally, there is inferior

commodities for which we observe income elasticity to be negative in that case with rise in income the quantity demanded we will fall.

So, the Engel curve will be downward sloping in this segment or you know Engel curve can be backward bending. So, this is the various possibilities in the case of Engel curve. Now note one particular commodity at a very low level of income, we will always act like a normal good. So, it can you know be the Engel curve can be a straight line or it can be you know convex or concave to origin, but it will be upward sloping.

But once some level of income is reached, then the consumer may think that the commodity that he know, he is whose consumption, he is increasing with income may not be you know a good idea to go with. In that case with extra income the consumer can abandon use of that good or reduce the quantity of that good and you know hence, we can observe with income increase the quantity consumption decreases for that good that will happen with the case of hamburger that you know, we were talking about earlier.

So, we have spoken about Engel curves and on and on. So, in the next lecture, we are going to continue this discussion on the impact of price change on consumer's equilibrium and demand.