PRINCIPLES OF BEHAVIORAL ECONOMICS

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Week 11

Lecture 11

Hello everyone, this is lecture 11 of the course on principles of behavioral economics. Today, in this lecture or module, I am going to talk about utility because the notion of utility, which is basically central to modern economics, requires special attention. Two conditions must hold in order for something to be a utility function. First, it must be a function, or a mapping from the set of alternatives into the set of real numbers.

This means that every alternative gets assigned exactly one number. While the utility function needs to assign some number to every alternative, it is acceptable to assign the same number to several alternatives. So, what it says in very simple term that we have talked about our preferences previously and suppose I get utility or satisfaction by consuming apples and oranges and I prefer apples over oranges. So, I get some utility from apples, which is supposed to be greater than the utility that I get from oranges.

Now, when we say that it must be a functional mapping from the set of alternatives into the set of real numbers. What it says is that if I can assign some number to these utility functions, I can say that I get 10 utils of satisfaction from apples and, say, 9 utils of utility from consuming oranges. So, of course, 10 is greater than 9. Alternatively, when we say that it is acceptable to assign the same number to several alternatives, which implies that, say, if I am indifferent between tea and coffee.

So, in that case, my utility function would assign the same numbers to both these alternatives. Suppose I get 5 units or 5 utils of utility by consuming tea. I must get 5 utils of utility by consuming coffee as well. Second, for something to be a utility function, it must assign larger numbers to more preferred alternatives. That is, if x is at least as good as y, the number assigned to x must be greater than or equal to the number assigned to y. So, the example I just gave, if x is apple and y is orange, then

If I prefer apple to orange, then of course I'd be assigning a greater number to X or apple than to Y or orange. Historically, the word utility has been used to refer to many different things including pleasure, happiness and satisfaction of receiving, owning or consuming something. Utility is nothing but an index or measure of preference. So the way we use certain concept to measure something else in a similar fashion utility is a concept which is used to measure preference. It can also be considered as an index for example when you talk about how prices are measured at the aggregate.

Prices are measured using some price index. It can be wholesale price index, it can be retail price index, it can be consumer price index. So here the measures are indexes. In a similar fashion utility can also be considered as a measure or an index. Given a rational preference relation you may ask whether it is always possible to find the utility function that represents it.

When this set of alternatives is finite the answer is yes. For any finite set of alternatives we must be able to assign utility to each and every alternative. or we must have a very clear precise utility function. When the set of alternatives is infinite, representing preference relations gets more complicated. It remains true that if a utility function represents a preference relation, then the preference relation is rational.

However, even if the preference relation is rational, it is not always possible to find the utility function that represents it. So, for infinite alternatives, we might not have utility function in order to represent that infinite set of alternatives. As you may suspect, a utility function will associate strictly higher numbers with strictly preferred alternatives and equal numbers with equally preferred alternatives. That is, the following preposition is true.

Given a utility function u (.), this is how functions are written when we are not specifying something. u (.) representing the preference relation, the following conditions hold. If x is preferred to y, then u(x) must be greater than u(y). This implies that the alternative is also true, that if u(x) is greater than u(y), then it must imply that x is preferred to y. Similarly, if x and y, one is indifferent between them, then utility generated from x must be equal to utility generated from y.

Alternatively, it is also true that if u(x) equals u(y), then the individual should be indifferent between x and y. One important point to note is that utility functions are not unique. Utility, as used here, is often called ordinal utility because all it does is allow you to order things— order our preferences. So, we can assign certain real numbers. We will be talking about it.

There are two approaches to measure utility. When we are just able to rank them the way we did in the previous slide—that x is preferred to y or x and y are two bundles between which an individual is indifferent— then it is all about ranking the preferences, and we call the associated utility or approach to measure utility ordinal utility. It is important not to ascribe any significance to absolute numbers. For example, if we assign numbers to x and y—say x is 10, y is 9.

To know that the utility I derive from listening to Arijit Singh is 2 tells you absolutely nothing about my preferences. But if you know that the utility I derive from listening to Lata Mangeshkar is 4, you know something, that I strictly prefer Lata Mangeshkar to Arijit Singh. So basically, having these numbers 10 and 9 simply signifies that X is preferred to Y. The numbers themselves do not say anything. Suppose there is something at 1.

So suppose there is a product with which we associate a number 1. It is not necessary that having a utility associated with at 1 implies that X is preferred by 10 times, Y is preferred to Z by 9 times and so on. It is equally important not to ascribe any significance to ratios of utilities. Even if the utility of Lata Mangeshkar is twice the utility of Arijit Singh, this does not mean that I like Lata Mangeshkar twice as much. The same preference could be represented by the numbers 0 and 42, in which case the ratio would not even be

defined properly or it is not well defined. So, if I do not like something altogether, I do not consume it. I can always assign a number equals to 0 to x. While I like something very much and I assign a number 242. In that case, having a ratio is meaningless. That is what probably it tries to say.

In brief, for every given preference relation, there are many utility functions representing it. A utility function in effect assigns one number to each indifference curve. We introduced indifference curve in previous modules. So each one of them is an indifference curve. And as we said previously that higher the indifference curve, higher is the level of utility.

So, following this approach of assigning numbers, we can always assign a particular number to one indifference curve—the level of utility that it represents. For example, the utility represented here is, say, 30; U2 represents a utility level of 35, and U3 represents a utility level of 43. This way, two bundles that fall on the same curve will be associated with the same utility, as they should be. So, since along this curve, utility U1 remains constant at 30, any two bundles are going to give me a utility of 30, and the same is true for U2 and U3.

Two bundles that fall on different curves will be associated with different utilities, again, as they should be. Of course, higher numbers will correspond to curves that are more strongly preferred, and therefore, we have U1 less preferred than U2, less preferred than U3, as the numbers would also suggest—30 is less than 35, which is less than 43. Remember that you choose rationally insofar as you choose the most preferred item or one of the most preferred items on the menu.

The most preferred item on the menu will also be the item with the highest utility. By now, from the discussion, it emerges very clearly. So, to choose the most preferred item is to choose the item with the highest utility. Now to maximize utility is to choose the item with the highest utility or maybe the combinations, the combinations representing the highest utility.

Thus, you choose rationally insofar as you maximize utility. Hence, to maximize utility is to choose or behave rationally. This is what it implies, the maximization principle and the rationality concept that we have learned so far. Now, talking about the historical evolution of utility, the concept of utility is one of the most basic building blocks in economic theory. In particular, it underlies the theory of consumer choice.

In this module, however, we will only be concerned with riskless choice. We have previously talked about consumer choice in a module. Now, when we say that we are going to talk about riskless choice, try to understand that in the neoclassical model where we had four components, one component was also summation delta raised to the power i. So, this probability concept is actually not there anymore.

We are not talking about probabilistic events. So, that is why we are talking about riskless choices. For example, when we make various kinds of decisions—how much to spend on different goods, where to go during our summer vacation, what job to choose. Given that we have very fixed and clear-cut preferences and no risk involved in those preferences. The assumption that the objective of the consumer is expected utility maximization is the most fundamental single component of the neoclassical model.

Just to recapitulate, NM stands for neoclassical model, dating back to Jeremy Bentham in 1789. In Bentham's original usage, the term utility referred to the experiences of pleasure and pain, which point out what we ought to do as well as what we shall do. This reminds me that later we will also talk about anticipatory pleasure and anticipatory pain. So he emphasized not only pleasure and pain but also pleasure and pain associated with what is going to happen in the future.

Thus, utility has a hedonic characteristic, which later researchers, notably Kahneman, referred to as experienced utility. However, the meaning of the term utility has changed since Bentham's time, and economists now tend to favor the concept of decision utility instead of experienced utility. This meaning of utility refers to the weight assigned to an outcome in a decision and is revealed by people's choices. It is this revealed preference meaning of utility that is generally used in the neoclassical model. We have also talked very briefly

about the concept of the theory of revealed preference or the concept of revealed preference. So in economics, mainly the concept of utility is associated with this idea of decision utility that basically tries to tell you how we make decisions. Then we basically consider or probably compare utilities associated with different options and accordingly take the best one that suits us, which a rational individual considers to be the best one. This modern concept of utility appears to have two obvious advantages over Bentham's concept. First, it is easier to measure since decision utility can be inferred from the choices and actions that people take.

Second, It no longer implies a commitment to a hedonistic philosophy. Sen in 1987, in particular, has been at pains to point out that the maximization of experienced utility is not always what people are trying to achieve. And his opinion is shared by many economists and psychologists. Now, again going back to decision utility, this is the type of utility usually discussed by economists since it is easiest to measure in terms of revealed preference.

It is important to note that decision utility does not, therefore, necessarily reflect attitudes or judgments. A study by Tversky and Griffin illustrates this point. Sixty-six undergraduate students were presented with the following information. Imagine that you have just completed a graduate degree in communications and are considering one-year jobs at two different magazines. The jobs are denoted by A and B.

(A) At magazine A, you are offered a job paying $35,000. However, the other workers who have the same training and experience as you do are making $38,000. Option B, at magazine B, you are offered a job paying $33,000. However, the other workers who have the same training and experience as you do are making $30,000. Approximately half the students were asked which job they would choose, while the other half were asked which job would make them happier.

So, as you can see, the difference between the two is that in one place you are getting a higher salary. But people of your rank, training, and experience are actually getting more than you. So, though the money is higher here, there is one upsetting factor also. Here, the money is less, but what can give you some happiness is the fact that people with the same training and experience are actually getting less than you. So, based on these differences,

the students were asked which job they would choose or which job would make them happier. So, the first question relates to decision utility, while the second relates to hedonic or experienced utility. In this case, the experienced utility is expected in the future, and it appears that people try to imagine what it would feel like to experience those states, involving the formation of an attitude. However, when people are asked to make a choice or decision, they tend to search for reasons or arguments to justify their choice. The difference was reflected in the survey results.

84% of the subjects chose (A), the job with the higher absolute salary and lower relative position. But 62% of the subjects thought that (B), the job with the lower absolute salary and higher relative position, would make them happier. The results indicated a distinction between choice or revealed preference on the one hand and actual preference in terms of happiness on the other. So, this example actually distinguishes between the concept of decision utility and experienced utility. Decision utility asks you to prefer job A because that would give you some pecuniary advantage.

But job B makes you happier. That gives you more pleasure, more satisfaction. That's why this is the experienced utility. Because being in the job, you would experience certain pleasure because others having the same training and qualification and experience are actually getting lower than you. So the pleasure associated with B is higher, which is basically that is why we call it experienced utility.

While people, if they go by typically pecuniary motivation, then they would choose A and that is related to decision utility. A more recent study by Comerford and Ubel reports a similar discrepancy between preference and choice utility. They find that people express a preference for jobs requiring more effort but choose jobs that involve less effort in a laboratory experiment In a laboratory experiment where subjects were assigned to work at a job based on the wage they set themselves on the wage they set themselves they also find that those whose wage demands led them to be assigned to the effortless job experienced lower enjoyment

than those who are assigned to the effortful job. So you would also realize that many times we tend to appreciate people, those who are very hardworking. But if I also, I am also made to work that hard, will I be actually enjoy that kind of a situation? Maybe not. So if I am asked to choose a very hardworking job, I may say no to it, given that the wages, there is no differences in the wages.

But we, of course, definitely appreciate people who are very hardworking and who put a lot of effort into their jobs. So that is why one is a decision factor, and another is a hedonic factor. Thus, we observe a discrepancy between preference and choice, and also between decision utility and experienced utility. Another discrepancy between choice, that is, decision utility and attitude, which could be related to experienced utility, arises when the object of choice or attitude has many attributes. For example, the consideration of a car may involve attributes such as safety, fuel economy, size, durability, and performance, to name just a few.

The standard decision-making approach involves two steps. Determine values for each attribute using some kind of scale, and determine weights for each attribute in order to compare them. So, that is a very methodical procedure, following which you can always arrive at a particular decision—which car to go for—given that every car has different features, and you can always have some idea about how you are going to associate certain values with different features. For example, a loss of one mile per gallon in terms of fuel economy.

So basically, we can consider fuel economy may be equivalent to two cubic feet of boot space. There may also be certain minimum requirements for each attribute. However, it has been shown—for example, by Tversky, Sattath, and Slovic—that this procedure is more relevant in determining attitudes or judgments. When it comes to preference, the most important attribute is weighted more heavily, presumably because it is a more convenient rationale for choice.

This bias is sometimes referred to as the prominence effect. This effect may also be explained by the Somatic-Marker Hypothesis proposed by the neuroscientist Damasio in 1994. SMH proposes that these factors create a 'somatic marker', an unpleasant gut feeling when a bad outcome connected with a given response option comes to mind. The somatic marker forces attention to a possible negative outcome from a given action and functions as an automated alarm signal

which says, 'Beware of danger ahead if you choose this option and its resulting outcome.' The signal may lead you to reject immediately the negative course of action and thus make you choose among other alternatives. So, it is mostly an instinctive call or an intuition-based decision which you want to go for. The automated signal protects you against future losses and allows you to choose from among fewer alternatives. In this context of the prominence effect, Damasio observed that people can still make good and quick decisions based on gut feeling.

So, in the Somatic-Marker Hypothesis, the idea was primarily dealing with negative possibilities, but he applied this in the context of the prominence effect to positive outcomes as well. In essence, Damasio is referring to the existence of visceral factors, but in this case, proposing that they can lead to better rather than worse decisions. Early economists believed that utility could be measured quantitatively in terms of an arbitrary unit called 'utils' using a ratio scale with a zero point. So, at the beginning of this module or lecture, I mentioned that the utility associated with apples can be 10 utils.

So, this is the concept of utils where we are using a unit that is to measure utility. For example, if consumption of basket A yielded 10 utils and basket B yielded 20 utils, then it could be said that the basket B yielded twice as much utility as basket A. or we can simply say that this is this facilitates comparison that basket B is preferred to basket A. Some economists even considered that utility could be added interpersonally, interpersonally meaning that a utility for John of 10 utils could be added to utility for Jane of 20 utils yielding a total utility of 30 utils for both of them together.

Some economists tend to disfavor any cardinal measure of utility. They do not prefer use of numbers in measuring utility. So, cardinal approach to measure utility is not much encouraged or preferred. Instead, they favor an ordinal measure where baskets of commodities are simply ranked according to preference. That is also we have just mentioned a few minutes ago.

This view implies that statements like basket A has twice as much utility as basket B are meaningless and certainly interpersonal additions of utility are invalid. So, while giving the example of Lata Mangeshkar and Arijit Singh, I also mentioned that having utils associated with them like 4 with Lata Mangeshkar and 2 with Arijit Singh, it does not necessarily imply that I like listening to Lata Mangeshkar twice as much as I like listening to Arijit Singh. And this is how all of you can relate that even if I say that I am very fond

of one thing, it's not quantifiable that I am twice fond of one thing compared to something else.

It could be reading, it could be about books, it could be about friends, it could be about movies, whatever we like or dislike. This kind of quantification in terms of ratios are actually meaningless. And since utility is very much of a subjective concept, again, adding utility across individuals are also a meaningless idea. I may consider, I may think that I get 10 utils of utility by consuming an apple. Someone is very fond of apples but he or she thinks that say she receives five utils of utility by consuming an apple.

So it is quite possible that her desire for apples or her liking for apples are much higher than me. Nevertheless it could be completely subjective evaluation about how much a number or what a number that I would like to assign to a particular preference. As a result of which adding 10 plus 15 does not make any sense altogether. The use of an ordinal measure as opposed to a cardinal measure has the advantage of involving fewer assumptions regarding the nature of utility. We do not need to be very strict about numbers, their comparison and etc.

The equilibrium conditions relating to the behavior of consumers in terms of utility maximization can be expressed in terms of ordinal utility. The law of diminishing marginal utility can also be expressed in ordinal terms. However, The neoclassical model does use a cardinal measure of utility since this has the advantage of being far more tractable mathematically than any model expressed in ordinal terms. At times, in order to facilitate exposition, in order to facilitate mathematical computations, we happen to use the cardinal measure of utility instead of ordinal measure.

So, it has certain advantages because of which we use cardinal measures. It basically though the concept itself is more abstract, but then when it comes to computation, then it facilitates basically receiving or arriving at a particular point. So, with this, I come to the conclusion of this lecture. In the next one, we will talk about different types of utility. These are broadly the references or other sources that have been utilized to prepare the slides and the lecture.

Thank you so much.