Behavioral and Personal Finance
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Module - 01
Behavioral Economics and Finance
Lecture - 03
Economics of Decision Making

Hi there, I am Abhijeet Chandra and welcome back to the course Behavioral and Personal Finance. This week we are going to discuss the Economics of Decision Making and we will also touch upon the utility theory, both the neoclassical economic utility theory and the VNM framework of utility theory. How many times has it happened to you that you come across several alternatives and you have to struggle among them to make a decision? For example, you go to a shopping mall and see a variety of items that you want to buy from, and you are not sure how you are going to choose the best among them.

Similarly, suppose you have some money and you want to invest in stock market instruments; let us say shares of different companies, how do you decide which company to invest in? These are some economic decisions which we face in our regular decision making processes and we try to understand how to make the best decision with the help of the utility theory in its classical framework and the VNM framework.

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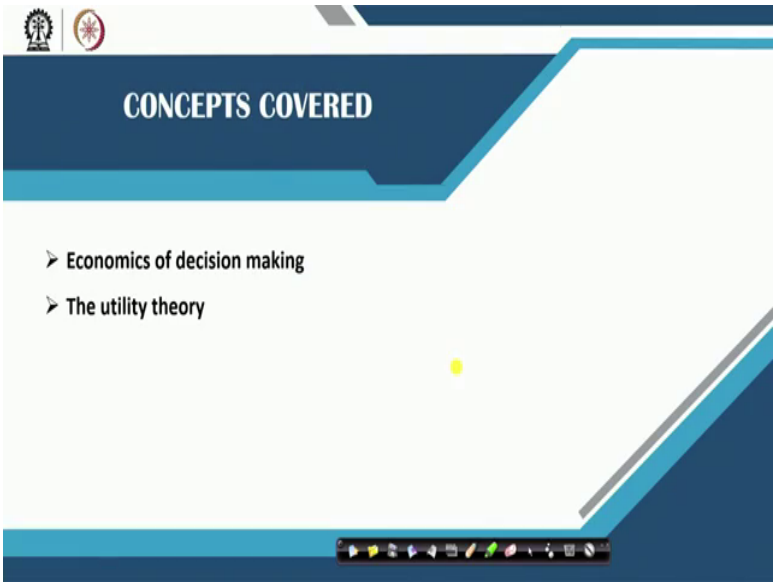

So, today's topic are basically the discussion on the economics of decision making process and the utility theory in its classical framework.

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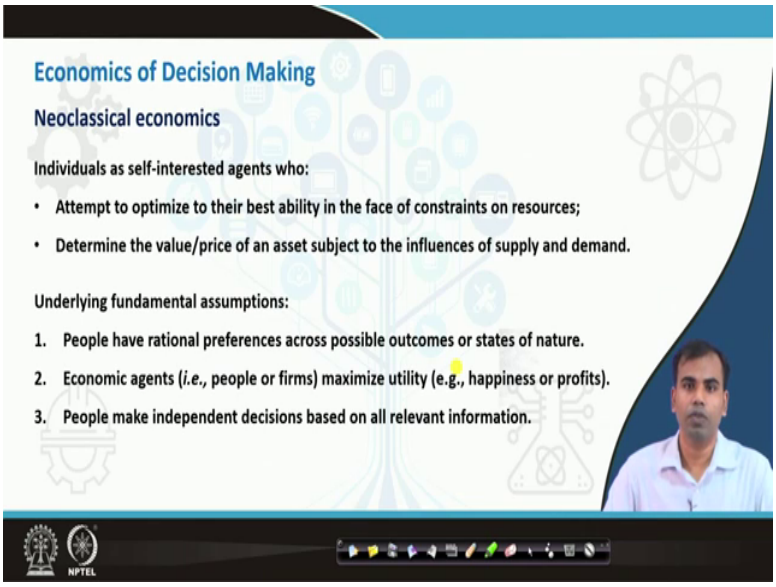

So, the utility theory in its standard format claims that individuals try to optimize the choices and options that they have and they want to determine the value and prices of the choices or the outcomes that they want to take. Now, that this basic framework of neoclassical utility theory is based upon three major assumptions.

These assumptions are as follows. The first assumptions suggest that individuals as economic agents have rational preferences. Now, what does rational preferences mean, it simply assumes that people have standard and constant choices over different outcomes and situations. Now, when we are discussing this neoclassical economic utility theory; I would also want you to consider thinking in terms of how these assumptions and the theory itself are relevant in the present context and also in the context of economic decision making that we often come across.

So, the first assumption that is rational preferences among individuals who are economic agents is followed by another assumption that suggest that these agents basically try to maximize utility. Essentially, these economic agents want to gain maximum benefit or the happiness or the profits out of the decision that they are making. Suppose you want to buy a shirt and you have gone to a shop, where there are several shirts displayed and you have a constraint in terms of the money that you can spend on buying a shirt.

So, here the objective is to maximize the happiness which is essentially the utility by paying on an amount that has limited resources and you cannot spend more amount on the same item that you want to buy. So, the constraint is the amount that you can spend on the shirt and the utility is the happiness or the benefit that you will get out of buying the shirt the outcome will be buying the shirt itself.

So, here an economic agent would try to maximize the benefit by paying the minimum price for the best possible shirt available in the market. So, this is the second assumption of the utility theory. Now, third assumption that the utility theory is based on is that information is available in the market to all economic agents and these economic agents make independent economic decisions considering all the information. Now, let us try to understand the relevance of these economic assumptions for this utility theory.

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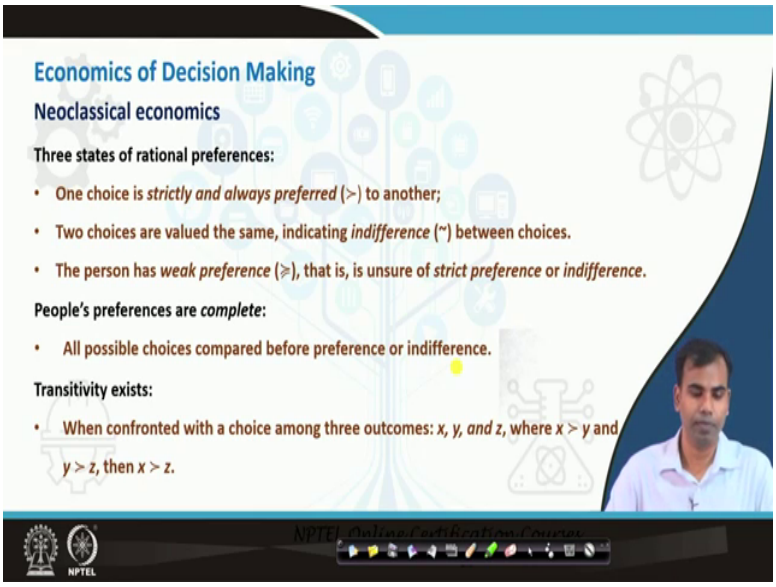

So, when it comes to rational preferences there are three states of economic preferences among economic agents. An economic agent can be strictly preferring one alternative over other; which means there is no choice, which means there is no choice dilemma and the economic agent ensure which one choice he would like to go for.

Second alternative explanation of rationally preferences is the economic agent is indifferent between two choices, which means if there are more than one alternative let us say there are two alternatives the utility or the benefit that the economic agent wants to derive from it is equal among these two choices that he has.

So, whether an economic agent makes a choice of alternative a or alternative b it does not make any difference in terms of the utility or the benefit derived. The third state of rational economic preferences the in unsurity of the economic agent. The third state implies that the

person or the economic agent is not sure whether he is indifferent or he is going to strictly prefer one alternative over the other, which essentially means that it could be strictly preferred choice of a over b or it could be indifferent between a and b. And ultimately it does not make any difference in terms of utility derived by the economic agent.

Apart from these three states of rational economic preferences, the economic utility theory also assumes that whatever alternatives are available to him are compared with among each other and on the basis of the benefits or the utility derived from each of them they are ranked and preferred over others; which means if you have five alternatives you will find the benefit or the utility derived from each of them, rank them in the order of increasing or decreasing utility and prefer the best one which has the highest utility in your terms.

Essentially, this leads to another assumption which implies that there exists a transitivity, which means if there are three alternatives let us say x, y and z, and x is greater than y in terms of utility. Similarly, y is greater than z, which means x in terms of utility is better or more preferred than y similarly y is more preferred than z. It will automatically lead to the preference of y over z; which means x is better than z in terms of utility derived. These are three major decisions; these are three major assumptions upon which the utility theory is based.

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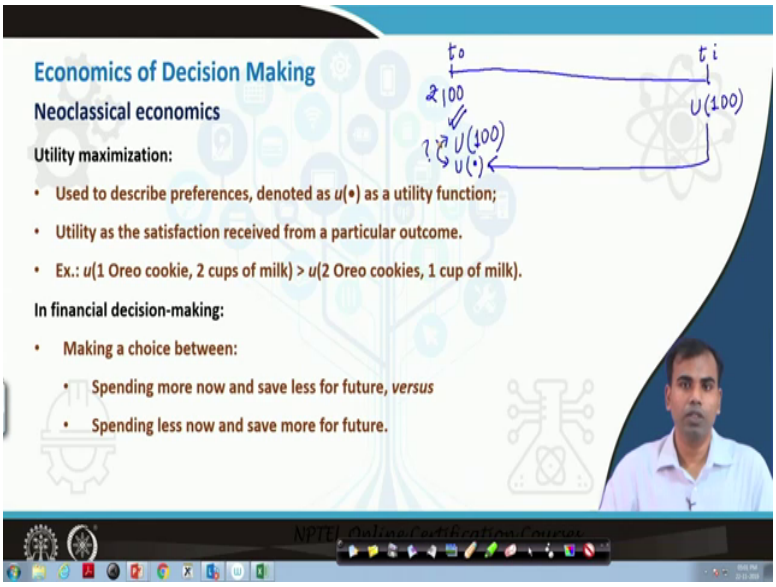

Now, when it comes to decision making economic agents want to maximize the utility, essentially they try to maximize the benefit derived out of the outcomes that they have and based on their derived utility they prefer the highest utility, they prefer the outcome with the highest utility. Let us try to understand how this kind of utility theory framework can be applicable in our financial decision making.

Let us say you are earning an amount of money, suppose you have x amount of money and the choices or the outcomes that you have is whether to spend more amount of money right now and expect the utility derived in present time or you save the money and spend it in future; which means, the utility that you will derive out of the outcome in future will be different from the utility that you are going to derive in present.

Let me try to show you with the example that we had discussed in previous session. Suppose, you have 100 rupees and you have two choices to spend now and save it later. So, on a timeline in the context of the previous example we have a timeline which is t 0 which is present time and this is let us say t i which is sometime in future.

Now, you have 100 rupees here, you can either spend it right now and get the utility or you can save it and get the utility of this 100 rupee in future. But remember in the previous framework we know that whatever decisions we have to make, we need to be on a single timeline to make that decision. So, if you want to have the utility of the amount of money that we are saving now and investing for future that utility must be brought back to present time to compare whether that choice is better or the choice that we are having right now.

So, in that context the utility of 100 rupees at time i should be brought back to present time that is t 0, and whatever utility that you get out of it should be compared with utility of 100 to be spent right now. And then accordingly the decision should be made. So, let us contextualize this example in financial markets. Suppose, you have 100 rupees and you can spend it right now on a movie and derived utility in terms of happiness, you can also save it this 100 rupees and deposit in bank, the bank will give you certain interest on the deposited money.

So, suppose after 1 month you get that 100 rupees plus the interest. So, let us say 100 rupees of your money and an interest of 5 rupees; so, 105 rupee at the end of 1 month. So, if you can gain more utility at the end of 1 month out of this 105 rupees and that utility is higher than the utility that you are deriving by spending it right now on a movie then definitely saving it for later make sense.

So, this is the kind of decision-making framework that utility theory helps us to understand. So, given this neoclassical economic framework of utility theory we can implement this approach to make choices and make better economic decisions, let us say in terms of whether to buy a house or to live in a rented house, whether to invest for future or spend right now or whether to invest in a career or keep working wherever you are working.

Once we understand this framework, we would like to know how we can quantify this utility. To understand the utility function and to simplify it in terms of some quantitative approach there is one of the simplest of methods to quantify the utility derived out of any decision. So, to keep it simple we are trying to explain the quantification of utility in terms of wealth.

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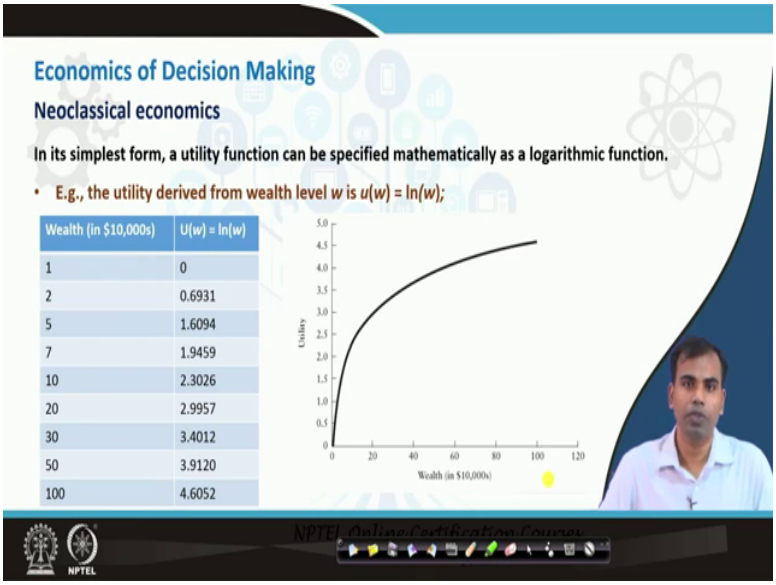

If you look at the table you observe that in one column the numbers represent the wealth that an individual or economic agent might have or the outcomes might yield and on the other column the numbers represent the logarithmic function of the numbers given in left column. If you try to see it in more continuous framework, let me try to show it with the help of a spreadsheet.

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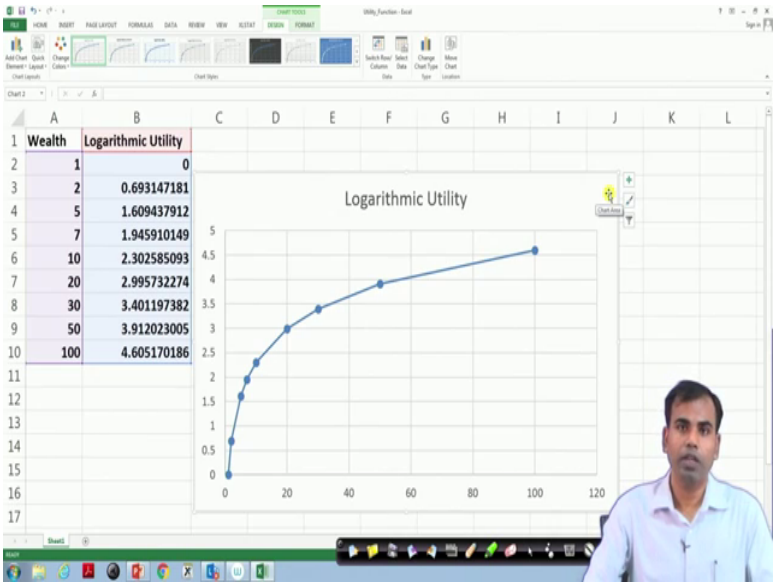

So, in column A, if you see the numbers are representing the wealth that an individual has and column B has the logarithmic utility function which is the simplest way to explain the utility in terms of numbers.

So, if we try to find the logarithmic value of the wealth that is given in column A, we will simply try to put log natural log of the numbers that we have here in column A. So, this is the value of logarithmic utility function of wealth of 1 rupee or 1 dollar. Similarly, if you try to calculate a logarithmic utility function for all these numbers given in column a we will find a series of numbers that will be basically the logarithmic value of the numbers given in column A.

To understand it if we plot these values in a graph we can simply show the curve representing the logarithmic utility function. If you look at the graph this is basically a concave curve

which essentially shows the logarithmic utility function. Now, let us try to understand what does, it mean for economic decision making. Suppose, you are given two alternatives, alternative a would want you to do a task that will get you a sheer a short return of 100 rupees whereas, alternative b would want you to do a task that is slightly more risky, but it will also give you a reward of 200 rupees.

Now, if you want to go for a more risky activity or more risky task that is alternative b you would certainly demand a higher payoff or higher return out of the activity. So, how much higher is the question? Let me put this in a context of a very simple example. Suppose, you have 100 rupees and you have an alternative to invest that 100 rupees in bank deposit or fixed deposit where you are sure to get a return of let us say 6 percent.

Now, you can use that 100 rupees to invest in stock market, let us say the share of a company and that share of a company has over period given a return of let us say 15 percent on an annual basis. But, there is also uncertainty; in some years the share of that company has given very little return as much as let us say 2 percent. So, the uncertainty is involved in alternative b. So, if you face a situation where there are uncertain outcomes, you would certainly expect a higher payoff from that outcome and that is what this utility function explains.

It suggests that if an individual is going for higher risky choices, the expected utility for that individual is going to be higher and this particular nature of the individual or the economic agent is known as risk aversion. Basically, risk aversion implies that if you face a situation which is uncertain and more risky you would demand a higher payoff or higher return to compensate the risk that you are taking.

In the example of stock market investment versus bank deposit, since you are likely to take higher risk in stock market investment you would want that the share of that company should give you higher return than the fixed deposit return if you have gone for a bank deposit. This particular risk aversion characteristic has been the baseline of many theories of finance and personal financial decision making, where people would want to understand what should be

the reward for the additional risk that an individual is taking in terms of assuming higher risky choices.

Having understood the utility theory and the utility function with the help of logarithmic values, we know that after understanding the rational preferences of economic agent and the choices that they can make based on the derived utility in terms of logarithmic utility function. They must incorporate as much information as available in the market before they make the final decision; that is the third pillar of expected utility theory.

The third assumption that the utility theory is based on is basically the availability of information for all the economic agent.

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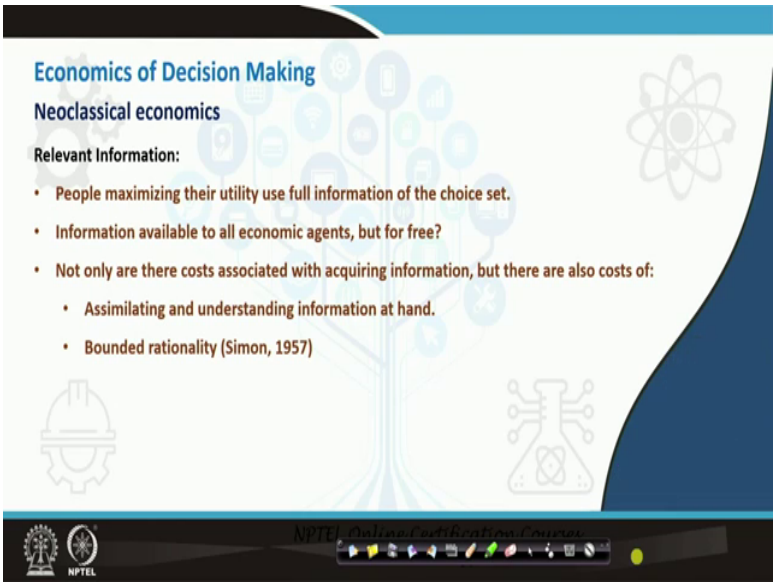

Basically, when you try to maximize your utility and you understand that you are just one of the economic agents available in the entire market, you would want to incorporate all the information that are prevailing. Now, the utility theory assumes that all the information are available for each and every economic agents equally and freely and they also try to incorporate every piece of information in their decision making without any constraint.

Now, when we look from the neoclassical economic framework, this assumption is perfectly fine, but when we try to understand in the context of realistic decision making processes, it does not make sense. Because, when it comes to incorporating economic information and basing decisions on that essentially not all of us are equally capable of incorporating each and every piece of information. Also every piece of information comes with a cost and not all of us are able to incorporate that cost in our decision making.

Based on these arguments there are some contradictions to the basic understanding of availability of information assumption for utility theory. These two issues which are basically the cost related to information and the capability of economic agents to incorporate and process all the available information in their decision making have been explained by Herbert Simon in his classical work on Bounded rationality.

This theory explains the limitations of individual economic agents in terms of processing of information and incorporating that information in their decision-making process. With this we conclude this session by suggesting that we learn about utility theory under the neo classical economic assumptions, but we also try to incorporate what are more realistic assumptions in the context of new utility theory given by the Van Neumann and Morgenstern.

Thank you very much.