Behavioral and Personal Finance
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Module - 01
Behavioral Economics and Finance
Lecture – 08
Non-expected Utility Preferences (Contd.)

Hi there, welcome back to the course on Behavioral and Personal Finance. In this session we will discuss more details about the prospect theory for which we had already discussed the basic behavioral assumptions. And, we will also see how it is different from the utility theory and the expected utility theory given by different economist in classical economics as such.

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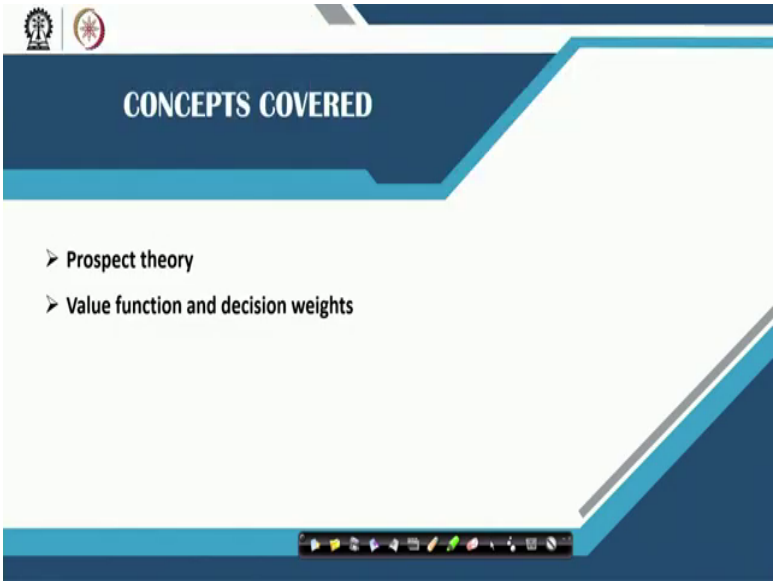

This particular session will be covering two major topics 1, details about prospect theory and 2 how prospect theory improvises by replacing probabilities with the decision weights. Now, here I can just start with a simple example that you might have observed as well. If you notice people who are involved in risky behavior, let us say as I was giving example of people who smoke. Since, they know the risk of smoking, they are involved in risky behavior; at the same time they are also involved in behavior which are contrary to the risk seeking behavior and that is risk averse behavior.

A simple example will be people who smoke also by insurance policies, if you know there are several people you might find who are involved in risky behaviors such as smoking and at the same time they are also into risk averse behavior such as buying insurance policies.

Basically, insurance policies are to mitigate the risk that they are undertaking in different way; more contextual example would be a case of an investor. If you talk to some investor who have some financial investments you know that they have investment in instruments such as shares, bonds, debentures, mutual funds, options, futures and other instrument. At the same time they also have some money kept safely in the bank deposits.

Now, these two types of instrument let say shares and bank deposits carries different type of risk. Bank deposits are considered to be safe which means the risk is 0 or almost 0; shares, investment is considered to be risky. So, this basically explains that people who are involved in risk seeking behavior might also be involved in risk averse behavior at the same time. Now, what could explain this particular behavior? Prospect theory has answer to this.

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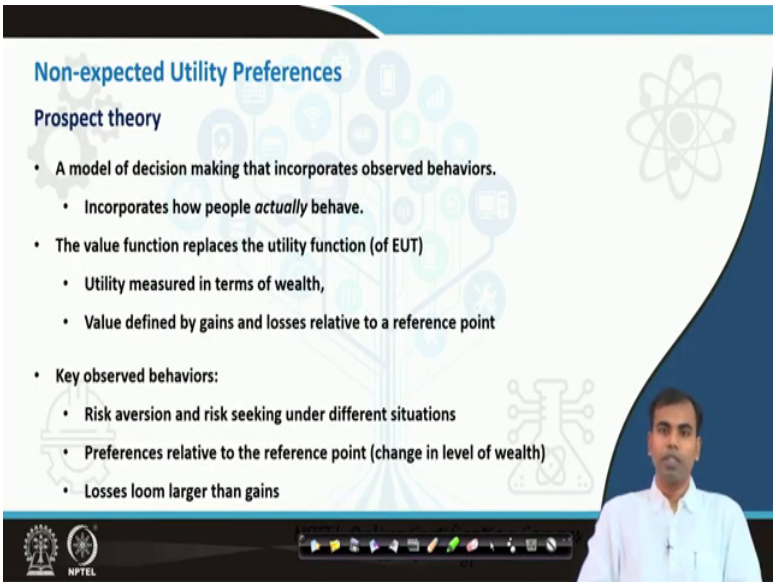

Prospect theory suggest that people's behavior might be driven by different factors. We have already discussed three measures three major behavioral assumptions, where we know that people's tendency to take risk would differ under losses and gains. Their perception of losses and gains and corresponding risk behavior and risk attitude is driven by a point a reference point, that is basically the status quo and they also are affected by losses more than by gains.

So, prospect theory explains this behavior of people having different type of investment with different risk attitudes. Similarly, in general behavioral seen if we notice or as I mentioned the example of people smoking buying health insurance would be explained with the help of prospect theory. We already know that a person having risk averse behavior would have a concave utility function and a person who is risk seeking behavior will have a convex utility function.

A person with risk neutral behavior which means indifferent between risky and certain choices will have a straight line utility function. Prospect theory has improvised the utility function with a value function. And, as we have known in utility calculation we assign probability to different outcomes. Prospect theory has change that probability with decision weights associated with the probability.

Now, if I try to explain the example of risky behavior and risks averse behavior at the same time; I could say that people assign different decision weights to the probability of different events or outcomes that is why they take risky choices and risk averse choices at the same time. For example, when people smoke, they know the consequences of smoking which means they know that it might harm their health.

And, at the same time they buy health insurance because they know that if something bad happens to them health insurance would be able to mitigate or minimize the risk caused by the smoking. The problem here is individuals or human being in general is myopic which means they fail to see beyond a certain point and that is reflected in their decision making process as well and that is where decision weights actually becomes more important.

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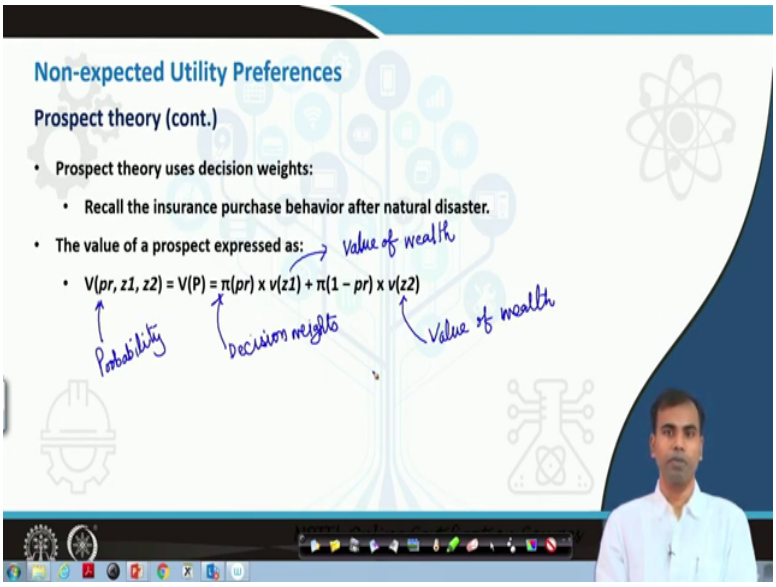

So, prospect theory has an improvised value function that is given here, if you see we have value of a prospect which is P given as probability and two different outcomes. Basically, these are not outcomes as explained in terms of wealth in expected utility theory rather these are value associated with those wealth level because, prospect theory is based on value function rather than the wealth utility function. So, here if I can try to explain this is basically the decision weight associated with the probability which we have already discussed in expected utility theory.

This is our different level of value of wealth. Similarly, this is again value of wealth too and this is the probability that we have already discussed. So, prospect theory explains this particular value function comprising of decision weights associated with the probabilities as denoted in this particular function in terms of pi. And, the probability associated with

different outcomes are given as p r and 1 minus p r and the outcomes are given in terms of value of wealth.

Not the absolute wealth rather the value of wealth derived in terms of the change relative to the status quo, that is what we have observed in the experimental evidence given by Kahneman and Tversky, where decisions are driven by value of wealth with a reference point. This is given here as z 1 and z 2. This particular prospect theory can explain why certain behavior are noticed under situation of risk and in a different case under situation of certainty.

Let us go through an example that will explain why certain people behave differently under same situation which means the example of people buying health insurance and smoking at the same time would be explained with the help of this example.

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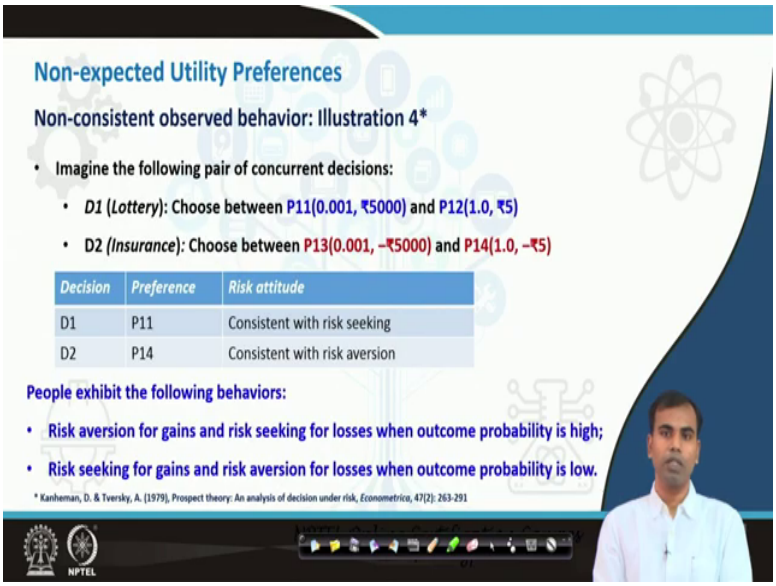

Like previous examples, this example is also drawn from one of the classic research papers published by Kahneman and Tversky. This example is intending to explain why people buying lotteries are also buying insurance. Now, this is very much related to the previous examples that we have discussed respective to the context. The example here presents two choices and the choices are these two D 1 and D 2 situations. D 1 is a lottery situation where a person is buying a lottery and this lottery has two prospects P 11 and P 12.

P 11 has a probability of 0.001 percent and the outcome could be 5,000 and remaining probability would be associated with the outcome 0. So, prospect 11 has a probability of 0.01 percent of winning 5,000 rupees, prospect 12 has 100 percent probability of winning 5. These two prospects are associated with a lottery ticket. In second situation which is D 2 it is related to the insurance buying decision and the prospects are P 13 and P 14. So, P 13 has a 0.01 percent probability of losing 5,000 rupees and 99 percent probability of losing 5 rupees.

Now, think through these numbers and suggest what should be the choices that individual should be making in these two decision situations. If I could relate to what they have found in their research conducted on a set of people through an experiment; the numbers and the results of the research indicate that for decision 1 which is a lottery case majority of people experimented indicate their preference for prospect 11 over prospect 12 which means the gains that they are going to get is 5,000 rupees with a probability of 0.001 percent which is effectively a very low probability event. And, this is consistent with the risk seeking behavior which means they are taking risk.

Under decision 2 which is D 2 most of the people experimented prefer this prospect 14 over prospect 13. Prospect 14 has two outcomes which is 5 rupee of loss with 100 percent probability and 0 loss with 0 probability which means a sure shot loss of 5 rupees. Whereas, prospect 13 has an outcome of 0.001 percent of probability for losing 5,000 rupees and this particular preference of prospect 14 over prospect 13 indicates the risk averse behavior. Basically, this comes to an interesting observation which suggest that people exhibit risk averse behavior for gains and risk seeking behavior for losses when it comes to a high probability event.

And their behavior changes to risk seeking for gains and risk averse for losses when the outcome probability is low. This basically implies that in case of high probability event we are risk averse for gains and risk seeker for losses. And, in case of low probability event we become risk seeker for gains and risk averse for losses. This particular example explains why people buy lottery ticket and insurance policies at the same time, because they assign different weights to the probability of the associated with the events.

For example, a lottery or insurance there are certain probabilities associated with success and failure and that is why the decision weights associated with these two outcomes could be biased because of individual preferences. The same can be explaining the example that we had discussed earlier, if you could recall peoples tendency to buy insurance policies right after natural disaster. So, they basically assign high decision weights to the recent events and that is why their decision to buy insurance policy is driven by the experiences, that they had recently in terms of facing the natural disaster.

A similar example if you could recall was discussed earlier where people who had faced difficult times in a stock market investment, let say people who have seen the stock market crisis of 1929; they have refrained from investing in stock markets for many years. But, people who have experienced prosperity during stock market boom of late 1990s they have been always optimistic and aggressive about stock market investment for years to come.

So, this basically explains why our decisions are driven by our recent experiences and the choices that we make in terms of risk averse behavior and risk seeking behavior. The answer is we assign different probabilities with decision weights and those decision weights are actually driven by our past experiences in fact, our recent experiences, because we could assign higher decision weights to our recent experiences than to older experiences. As we have already noticed that most of us are myopic in terms of decision making processes.

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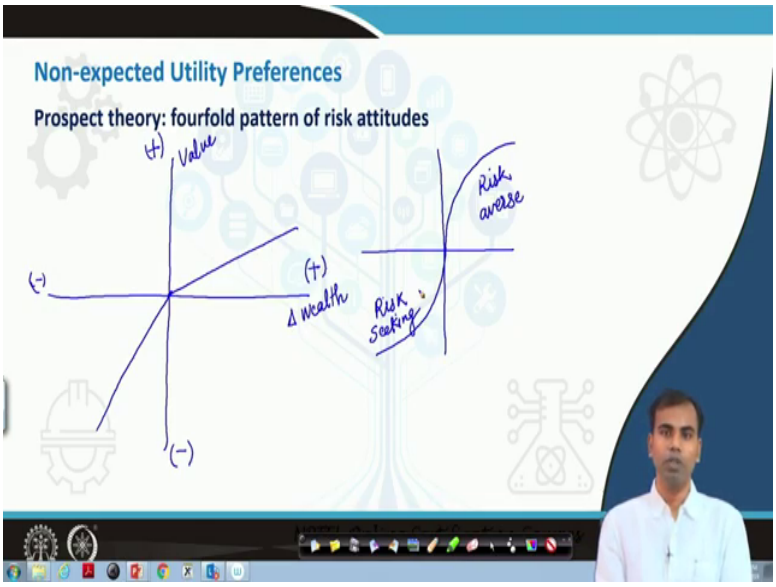

Having discussed all these examples of risk averse and risk seeking behavior under different circumstances of losses and gains we have also understood that most of our decisions are driven by a reference point which is basically a relative distance from the status quo translated in terms of losses and gains.

And, we have discussed that our decisions and risk attitude is suffered with a situation where losses affect us more than the gains. This comes to the summary of prospect theory that can be exhibited through a couple of graphs. Let me try to show this with the help of two exhibits. One exhibit suggest how our value function is observed when it comes to a different level of wealth in terms of losses and gains.

So, if the value curve is denoted as the vertical axis and change in wealth is denoted as horizontal axis which means, this is negative this is positive. Similarly, this is positive and

this is negative value. Prospect theory suggest that our value function for positive value and positive wealth would be denoted such as this and for negative value and negative wealth it is steeper denoted as this. We have also discussed briefly when we combine risk seeking and risk averse behavior under different circumstances, our behavior could be our utility function could look something like a concave curve and a convex curve or in terms of risk seeking and risk averse behavior.

So, this is basically risk averse utility function and this is risk seeking a utility function which we have already discussed. Now, when we try to conclude what Daniel Kahneman and Amos Tversky research on different situations of losses and gains indicate. Basically, it suggest that the extent of change in wealth and the level of probability associated with the outcomes determine whether we are going to behave in a risk seeking or risk averse way and that can be shown with the help of this particular matrix.

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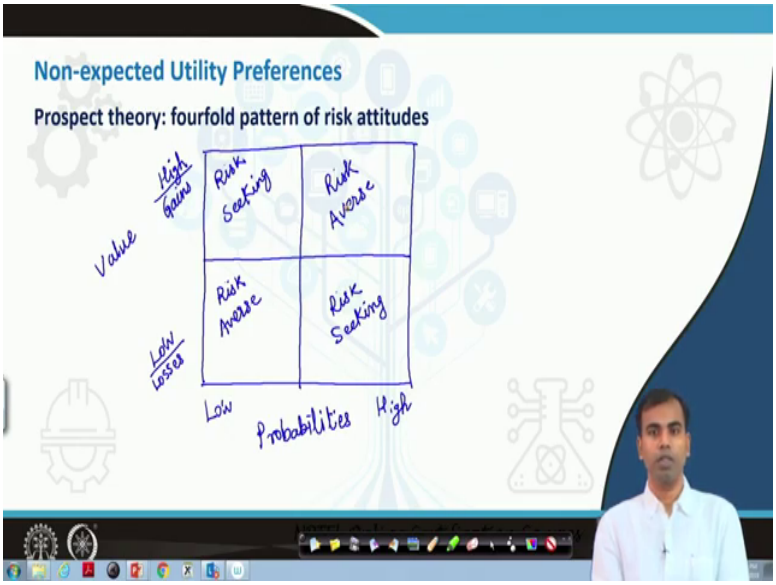

So, if we have a situation where probabilities are indicated in terms of high and low, this is low probability and this is high probability. Similarly, value is also denoted in terms of change of wealth from a reference point; so, this is high value and this is low value. So, when it is about a situation where the probabilities are low and values are also low; then our behavior is basically in the nature of risk averse as we have seen through a previous example.

If we have high probability of low value then our behavior would be risk seeker. So, essentially when I talk about low value it implies that it is losses in value from a reference point and if it is high value it implies gains which means the change of wealth is positive from a reference point. Similarly, if we have low probabilities with gains or high value from a reference point our behavior would be of risk seeking nature. And, if it is about high probability with high value or high gain our behavior would be risk averse.

So, this matrix basically presents the summary of prospect theory in terms of individual behavior when it comes to making choices related to risky and certain situations under different level of probabilities.

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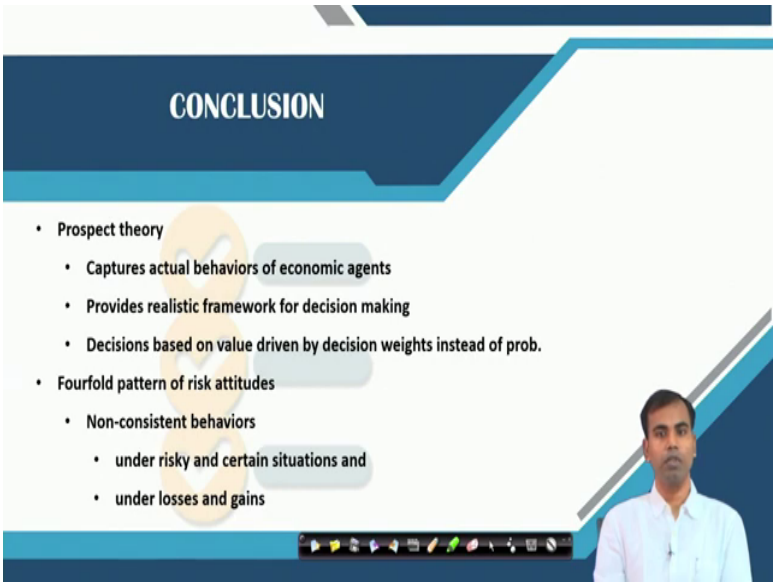

To summarize the discussion that we have in this session, we have discussed about the basic framework of prospect theory which is basically a positive theory in terms of explaining how people actually behave. It is also about our decision making framework that captures decision choices based on the value rather than utility or wealth and decision weights rather than probabilities associated with the outcomes. But, this particular prospect theory also presents a fourfold pattern of risk attitude.

The fourfold pattern of risk as attitude is the same that we have just explained, the four blocks of a matrix where our decisions would not be consistent under high and low probability event where the outcomes are losses and gains. So, we exhibit as individuals non-consistent behavior under risky and certain situations and under losses and gains.

With this we come to a conclusion that prospect theory is certainly more closer to the realistic decision making framework than the expected utility theory, that has been proposed under neoclassical economics. We will see a more aspects of prospect theory and how it is related to the financial decision making in coming sessions.

Thank you very much.