Hi, there. Welcome back to the course Behavioral And Personal Finance. In this module, we will discuss the Prospect Theory and its application to finance and financial decision making. So far, we have learnt about how prospect theory is an improvisation of the expected utility theory that is very standard and how prospect theory can help us making decisions which are more realistic and close to the real world situations.

In this session, we will discuss two major topics: one is framing effect and another is the reference point. Before we move on to the topics let me give an example.
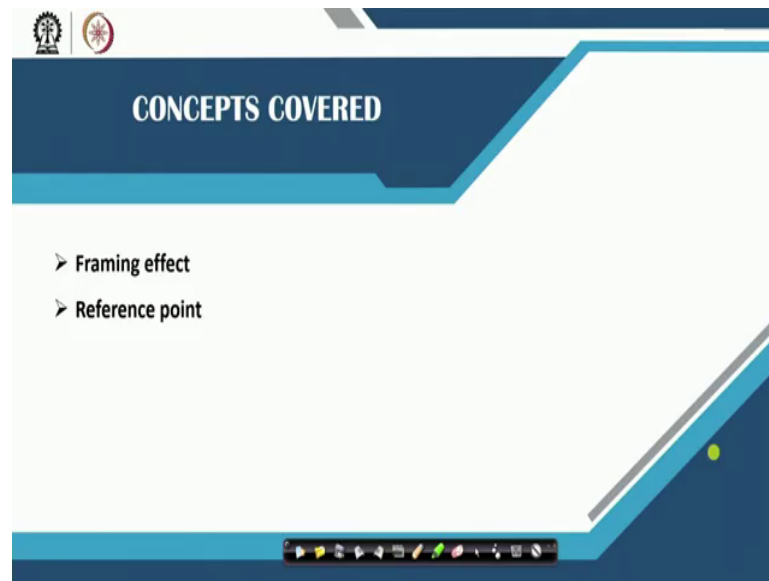
Suppose, you are given some amount of money and there is a coffee mug with the logo of the university and you are asked to pay a price for this coffee mug. What price would you like to pay for it? Make a mental note and imagine a different situation. Now, in a different situation you already own the mug with the university logo on it and you are asked to trade this mug for some amount of money.

These are two different situations where in one case you own the money and you want to buy the coffee mug, whereas, in a different situation you own the mug and you have to quote a price for which you can trade this mug for. If you think carefully you would realize that the prices or the economic value for the mug you would decide would be different in these two scenarios.

This is where prospect theory comes in hand picture and explain why people value things differently in different situations. We have already learnt that people are risk averse in general and the losses or the situations with risk and uncertainties are valued completely differently than the situations which are certain and in terms of gains.

We have discussed earlier that under prospect theory losses loom larger than gains which means if you have something to lose you would quote a value which is different from you have something to gain of the same economic value in the key. In the example of coffee mug, you have coffee mug with you and you would not like to part away with that is why you would quote a higher price than the situation where you have to buy the coffee mug. This phenomena basically is known as endowment effect.

We will try to discuss with a some examples the situations of similar nature that can be explained with the help of prospect theory assumptions. The first example or the first phenomena that we are going to discuss here is the framing effect.

Now, what do I mean by framing effect. Basically, when we talk about framing effect we talk in terms of a decision frame which basically is decisions maker view of the problem and possible outcomes. Implying that you have a situation where you have some problem to handle and the possible outcomes if you go for certain decision path.

Now, that decision frame basically can be influenced by certain other characteristics. For example, how the possible outcomes are presented to you would determine how you will evaluate the outcomes and finally, it make a decision. So, presentation of outcomes is an important factor. At the same time how people perceive the outcomes and the problems would also be important and of course, the individual characteristic of the decision maker would be equally important.

So, when you are taking a decision within a decision frame the presentation of the decision and the possible outcomes and personal characteristics as well as the perception of the problem in terms of decision makers point of view would be important in terms of deciding the decision frame.

If we go by the standard expected utility theory, the choices irrespective of the presentation matter similarly for the decision maker whereas, in real world as explained by prospect theory decisions makers choice changes because of the changes in frame implying that if outcomes or possible choices are presented differently the decision makers ultimate decision would be influenced. Let us try to understand this with some example.

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Prospect Theory and its Applications
Framing matters: Illustration 1*

- Imagine that a country is preparing for the outbreak of an unusual disease which could kill 600 people. Two alternative programs to combat it (*with scientifically estimated results*) are:
  - *A:* If adopted, 200 people will be saved.
  - *B:* If adopted, there is a 1/3 probability that 600 people will be saved, and a 2/3 probability that no people will be saved.

Decision	Preference	Risk attitude
A	72%	Consistent with risk averse

People exhibit risk aversion here (in survival frame).

* Tversky, A. & Kanheman, D. (1981), The framing of decisions and the psychology of choice, *Science*, 211: 453-458

Here I am going to explain an example which is drawn from Daniel Kahneman and Amos Tversky research work and it is basically explaining the implication of prospect theory in non monetary terms.

Imagine a situation where there is a country and the people are the people in the administration are planning to take a measure which will handle a disease and its possible impact. So, the situation here is the country is planning for the outbreak of an unusual disease that could possibly kill 600 people. Scientifically robust methods suggest two possible methods, two possible approaches – A and B.

If the country goes with decision A it will be able to save 200 peoples and if the country goes for decision B it will be able to save 600 people with a probability of one third and there is another remaining probability two third that there will be no person saved from that disease. Now, what will be your decision in this case? If you are in this situation where you have to take a call between choice A and choice B what would you favor?

The result of the experiment conducted by Kahneman and Tversky suggested that majority of people here go for decision A which means people go for decision which will give them a sure shot saving of 200 lives from that particular disease. This basically is consistent with the risk averse behavior of individuals when it comes to certain decisions and its outcomes. This particular example is given in terms of survival frame. Let us change the scenario and create the same situation in a mortality frame.

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A second dimension of the same problem would be imagining a country that is trying to prepare for the outbreak of an unusual disease which could again possibly kill 600 people and there are two alternative methods. These two methods are scientifically robust and the methods are C and D. If the country goes for method C 400 people will die and if the country goes for method D there is one third probability that nobody will die and two third probability that 600 people will die.

Now, if you are a rational human being and you could compare the situation with the previous example, you could understand that there are similar situations in these two scenario as well, but the experimental results by Daniel Kahneman and Amos Tversky suggest that most of the people conducted the experimental result shows that most of the people on whom experiment was conducted go for decision D.

Now, this particular decision D which is basically one third probability that no one will be die and two third probability that 600 people will die is consistent with risk seeking behavior which implies that when people are faced a situation where they are going to lose something they look out for risky risk seeking behavior and this is very much consistent with the prospect theory.

Now, these two scenarios explain how people behave under sure outcome and how they behave differently under risky and uncertain outcomes. Experimental results over the years suggest that this behavior is similar and observed in very much consistence across students, professors and physicians alike.

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If you analyze this particular example a bit more carefully you would understand that choices shown here are presented differently whereas, the outcome or the possible outcomes of all the

choices are consistent and same. But, thus framing of these problems these two examples are done differently.

In first case where choices A and B were presented, the framing was survival frame which means people have to decide in a situation where we start from full mortality and move towards partial survival which is basically a gain because whenever we talk about saving life essentially we are talking in terms of gains and in another scenario C and D, we were talking in terms of full survival and moving towards partial mortality.

So, when we talk about mortality or conceding death or casualty basically we are talking about losses and prospect theory has already shown that when it comes to valuing different alternatives we consider losses stronger than the gains and that is why in this case also loss losses in terms of lives loom larger than gains in terms of saving lives.

And, if you could recall we remember that prospect theory as explained by a graph basically suggest that the curve of gains are less steeper than the curve of losses. Just to highlight and the situation that we have been talking in these two examples we can refer to the prospect theory graph that is shown as follows.

So, we know that the prospect theory graph can be shown as a 2-dimensional curve where basically we talk in terms of value which is positive and negative and we talk in terms of change in wealth which is positive again and negative and we know that if we move from this point towards positive point the shape of the curve is less steep than the situation when we move towards losses.

So, this is basically your gain and if we try to explain in terms of prospect theory with reference to these two examples a loss of this amount would have different value than a gain of same amount. This is what prospect theory shows and we can consider through these two examples – one in terms of mortality and survival frames and the another example of coffee mugs where you have something with you and selling that coffee mug means losing.

So, when you try to lose something you value that loss almost twice more than the same amount of gain you are going to have. These two things as discussed in examples suggest that people make decisions with reference to a particular status which can also be known as status quo.

In the graph that I have just shown that status quo is basically the central point which you can refer to as reference point which means, peoples decision basically depends on whether you are moving upward from the reference point in the region of gain or you are moving downwards towards the loss region.

If you are moving towards loss region, you would value something stronger than the same amount or same volume of movement in gain region. Let us try to explain this reference point phenomena with the help of another example.

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When we talk about reference point we basically mean the status quo or an anchor and this is very much relevant in terms of financial decision. If you remember some examples we have discussed earlier we know that if we buy some something for a price let say a share of a company if I have purchased the share of a company for 100 rupees and I am holding it for quite some time meanwhile the price of that particular share in the market keeps falling and currently it is available at 98 rupees.

So, I have two choices either I keep holding that share for which the value is low or being lost or I can sell that share for 98 rupee and realize the loss. Now, if you relate this example with the phenomena that we have just discussed most of us would not like to sell that for a lower price and rather wait for the price to recover to 100 rupees and then probably we would like to sell. This is basically known as anchor. So, most of our decisions are stuck to an anchor or the

status quo and whatever decisions we are going to make basically mean movement away from that status quo or the anchor or in these terms the reference points.

Now, let us consider a similar situation here suppose an outcome is perceived a positive or negative deviations from the reference point. In this example imagine a person who is playing a game and so far he has already lost 140 dollars. Now, this is the last bet of the game and after that the game would be closed. So, the last bet would cost 10 dollars additionally and the last bet has an odd of 15 is to 1 which means if you win you will get 15 times the cost or if you lose you actually lose the cost of that particular bet.

So, basically the decision choices here you have is you have 15 is to 1 means either for this 10 dollars of cost you would get 150 dollars or you would lose 10 dollar altogether. Now, this situation shows that for that particular player who has already lost 140 dollars in the game during the day and this is the last 10 dollars he is going to bet on.

If there are two possible scenarios; in one scenario the person would consider that he would win and he would get 150 dollars which would basically break even his total loss implying that 140 dollars of loss so far and 10 dollars of cost for this particular last bet total of 150 dollars if he wins will be recovered which means there will be no profit no loss and he will break even. And if he loses he loses 150 dollars because so far he has lost 140 dollars and if he loses the last bet this last 10 dollar would be added to the loss and it will become 150 dollars.

In another scenario, if he gains he would get 150 dollars and if he lose he will lose only 10 dollars. Depending on how he consider the reference point or how he decided the reference point for his decisions his scenario would change. Let us call these two scenarios integration and segregation. So, if he is following integration it implies that he would consider the total loss for the day as the loss and accordingly he will make a decision and if he consider follows segregation the last bet would be the independent bet for which 150 dollars of the gain versus 10 dollars of loss.

Now, imagine yourself in the situation if you are facing two different scenarios in one of which is basically 150 dollars of gain versus 150 dollars of loss and in another scenario 150 dollars of gain versus 10 dollars of loss how your risk attitude would change? Now, this two scenario depending on whether the person is following integration or segregation of risk or the losses, his risk taking ability would change.

In cases of integration peoples risk behavior turns towards risk seeking and they would consider the losses and they would start taking higher risk. When it comes to segregation people exhibit risk averse behavior because it is basically in the domain of gains.

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Now, if you try to relate this with prospect theory again and with help of the graph that we had discussed in one of the last sessions we know that situations could be on 2-dimension –

one is probability of outcome which is high or low and the value of the outcome it could be gain or losses high probability, low probability, high gain, losses.

Now, the prospect theory suggest that most of our behavior is basically fourfold pattern that we exhibit. When we have low probability and loss reason basically the decisions which carries low probability and loss our behavior is basically risk averse whereas, if we are facing low probability event with gains our behavior becomes risk seeking and on the contrary, if we have high probability loss outcomes our behavior is risk seeking. And if we face situations with high probability and gains we behave risk averse which is basically nothing, but sure shot outcomes. So, when we face sure shot outcomes our behavior is risk averse.

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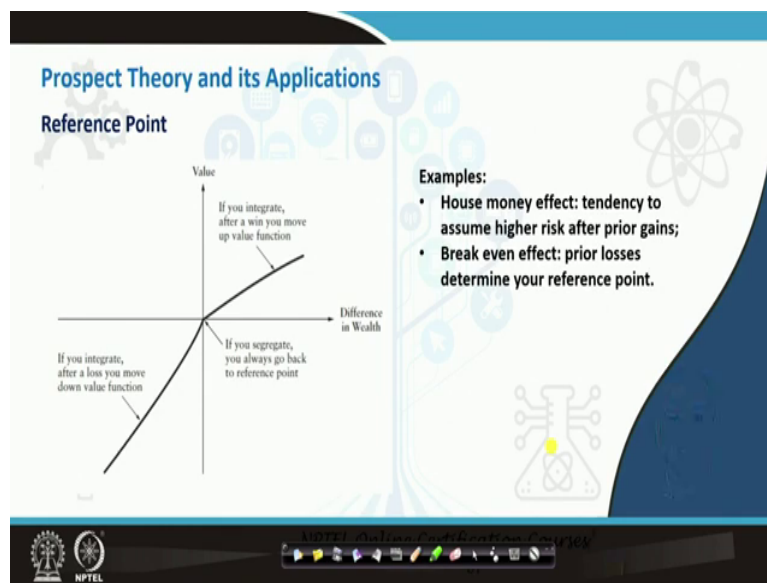
This particular phenomena can be explained with the help of another graph that is directly coming from prospect theory. If you could relate that game example where person either

integrates or segregates the losses or the gains as you integrate your outcome basically after a win you move up in the value function on the right hand side and if you integrate after a loss you move down to a value function on the negative region.

And, if you segregate which means you are changing your reference point and going back to that particular reference point again and again. You can see the impact of these behavioral changes in different scenarios. And, some of the classic examples are house money effect which basically implies that when you are in a casino and you have one few bets in a row you start taking higher risk.

So, house many effect indicates the tendency to assume higher risk after a prior gain. And, if you have losses before and after that you are making a decision and you are trying to integrate you would show a phenomena that would basically determine your risk taking ability and this is known as breakeven effect.

So, these two effects are most common when you talk about integration or segregation of value in terms of losses or gains. And, most of the time we always go back to the reference point again and again be it the financial decision in stock market or our household financing decisions or our personal career choices or any other decision where we have some economic values attached and that is why keeping in mind the prospect theory becomes more important. These are two major points that we have discussed in this session.

To sum up basically we learnt about how prospect theory can be applied in terms of framing effect where decision frames influence our final decisions and it is affected by the presentation of the outcomes and perception as well as personal characteristics of the decision maker.

We know that framing of choices matter. For example, if you have seen the document given along with the insurance policy you know that you have to go through a lot of conditions and terms that are applicable for buying that insurance policy, but most of us do not probably read it thoroughly. Now, if only that terms and condition document is simplified and summarized in a table somewhere in the beginning or at the end probably that would definitely ease out our decisions.

So, what basically implies that if the presentation of outcome is changed to more conducive way, probably it will make the decision makers job easy. We also learnt that decision makers job is always with respect to a reference point which in most cases is the status quo or an anchor. People also tend to segregate or integrate losses or gains and based on that their reference point change. This is it for this particular session.

Thank you very much.