PRINCIPLES OF BEHAVIORAL ECONOMICS

Prof. Sujata Kar

Department of Management Studies
IIT Roorkee

Week 47

Lecture 47

Hi, welcome back to the course on Principles of Behavioral Economics. This is lecture 47. We are discussing intertemporal choice models, and in the previous module, I was discussing anomalies of the discounted utility model. We discussed five such anomalies, and in this, I will first talk about one more anomaly and then we will introduce time-inconsistent behavior in order to proceed further toward the formation of behavioral intertemporal choice models.

Of course, time-inconsistent behavior has already been introduced; nevertheless, a formal introduction to when and how behavioral economics—or the thought of behavioral economics— thought of bringing changes to the classical tradition. So this is the last anomaly of DUM—that is, violations of independence and preference for spread—that we thought of discussing. So the assumption of consumption independence implies that preferences between two consumption profiles should not be affected by the nature of consumption periods in which consumption is identical in the two profiles.

So consumption independence was already discussed in the last module. Again, there is evidence suggesting that consumers may respond differently in situations that are logically equivalent. For example, Loewenstein and Prelec have found that when people are given a simple choice, like dinner at a fancy French restaurant next weekend or dinner at the same restaurant on a weekend two weeks later, most people prefer the first option—basically, the sooner, the better. they go for the sooner dinner. This is predicted by the discounted utility model—no problem here. You want to bring forward pleasurable events

because people discount the utility of the later event more heavily. However, the investigators observed different results when subjects are offered an elaborated choice. For example, dinner at a fancy French restaurant next weekend and dinner at home on a weekend two weeks later or dinner at home next weekend and dinner at the French restaurant on a weekend in two weeks. In this decision situation, most people prefer the second option.

So interestingly, as you can see that if you are not eating out, then dinner at home is basically the default option. So dinner at home is the default option. But when it is elaborated that is dinner at home is included in your choice list, then your preferences change. Since the most likely event for subjects is to have dinner at home, the elaborated options C and D amount to the same as the simple options A and B. Thus, there appears to be a framing effect causing preference reversal.

The psychological explanation here appears to be that the elaborated options draw attention to the sequence of outcomes over time and people prefer an improving sequence. It was also previously mentioned that people prefer improving sequence. If they are asked what kind of pains they would expect in a period spanning up to 20 years, they wanted a declining profile in the sense the situation should improve. Loewenstein and Prelec also observed a preference for spreading outcomes against a violation of independence. An experiment involved subjects hypothetically receiving two coupons for fancy restaurant dinners and asking them when they would use them.

Two different conditions were used, one involving a two-year time limit and the other involving no time limits. Results indicated that subjects schedule the two dinners later with the two year limit like 8 weeks and 31 weeks than when there are no limits like 3 weeks and 13 weeks. So basically when there are limits specified then they basically spread it across a longer period of time. It appears that framing the offer with a two year limit causes the subjects to spread their outcomes over a longer period if the two year horizon is longer than the implicit time horizon used by subjects who face no time limits.

So in the context of no time limits, basically it was completely up to the responder to decide what could be the time limits. But anyway, two year could be a pretty long period of time compared to that no limits when it is mentioned. It is possible that they did not spread it as much as two years and consequently had it much faster than what people had when they were mentioned that the limit being two years. This is another example of an anchoring effect. So this individuals basically anchored their spacing of the two events on the basis of what is specified that is two year.

Whereas for the second group of people there was no anchor. There is also evidence that people have a preference for spreading incomes as well as consumption. a phenomenon referred to as income smoothing. A natural experiment occurs in California, where about half of the United School Districts give teachers the choice of receiving their annual

salaries in 10 or 12 monthly payments. The DUM would predict that teachers should choose 10 payments and earn interest on their savings.

One thing should be mentioned here that the income is constant. The total income is same. So either that can be divided into 10 installments or 12 installments. So the point is that if you receive it early, then You can always keep it, but you have to spend, you know, over a period of 12 months.

So you would be depositing some money in the account, in your bank account, and would receive interest. So as a result, this should ideally be a rational decision to go for 10 installments. However, in reality, about 50% of the teachers chose 12 installments, even though over a long period of time the interest foregone is considerable. The psychological explanation, supported by a survey of the teachers, is that the 12-monthly payment option, by spreading the receipt of income, facilitates self-control over spending.

So basically, when it is given in 10 installments, of course, every month you would be receiving a larger amount. So you fear that you must not end up spending all of it, as a result of which you want to spread it across 12 months. So with this, I complete the anomalies on DUM, and now we start discussing time-inconsistent behavior in economics. The bulk of Smith's writing on what we would now consider behavioral economics appeared in his earlier book, The Theory of Moral Sentiments, published in 1759. This is what we are calling the earlier book because his most popular book was published in 1776, most popularly known as The Wealth of Nations.

It is here that Smith expounded on self-control. Insightfully, he portrayed the topic as a struggle or conflict between our passions and what he called our impartial spectator. The crucial feature of Smith's conception of our passions is that they are myopic, that is, short-sighted. As he framed it, the problem is that the pleasure which we are to enjoy ten years hence interests us so little in comparison with that which we may enjoy today. Some early economists viewed any discounting of future consumption as a mistake, a failure of some type.

It could be a failure of willpower or, as Arthur Pigou famously wrote in 1921, it could be a failure of imagination. So it is to be noted that Smith, Pigou, and all these earlier economists were able to see or notice that people do not actually behave very rationally. They suffer from self-control problems. Discounting future consumption is a mistake.

They understand that this is how people do not behave. Quite evidently, from Adam Smith in 1776 to Irving Fisher in 1930, economists were thinking about intertemporal choice with humans in plain sight. So their approach towards intertemporal choice was very much human. Econs, those irrational cold beings, began to creep in around the time of Fisher. As we started on the theory of how Econs should behave, but it fell to a 22-year-old Paul Samuelson, then in graduate school, to finish the job.

So, basically with Paul Samuelson's discounted utility model, we actually made humans or thought of humans behaving just like Econs. Now, let us understand how discounting works in the sense we have already talked about DUM whether people actually fulfill the assumptions or the framework of DUM or not. Suppose Ted and Matthew both live in London and are avid tennis fans. discounts at a constant rate of 10% per year, so he is actually an exponential discounter. For him, that match would be worth 100 utils, any particular tennis match this year, 10% discount, 90 next year, then 10% would be 81, that is 10% of 90 subtracted from 90 is 81, 72 and so forth.

So he is an exponential discounter. Matthew discounts anything that he has to wait a year to consume by 30%. The next year at 10%, And then he stops discounting at all that is 0%. Matthew who also values that match at 100 today,

but at only 70 the following year because his first year discount is 30%. So what is 100 today becomes 70 in the next year. The following year, it would be like 63 that is in year 3. So in the second year after 30% it is 70 and in the third year he applies 10%.

So this is like 10% of 70 subtracted from 70 gives you 63 and after that 0%. So for any periods thereafter it remains 63. The technical term for discounting of this general form that starts out high and then declines is quasi hyperbolic discounting or alternatively known as present bias. So this is a more behavioral economics or behavioral science type terminology. Hyperbolic discounting is more mathematical, so present bias is what the behavior can be termed as.

To see why exponential discounters stick to their plans while hyperbolic or present-biased discounters do not, let us consider a simple numerical example. Basically, we continue with the example of Ted and Matthew. Suppose both Ted and Matthew have won a lottery offering a ticket to a match at Wimbledon with an intertemporal twist. All tickets are guaranteed, so we are not considering any risk involved in it. They can choose among three options.

So, they have won only one lottery. The options are: First, option A: a ticket to a first-round match this year. In fact, the match is tomorrow. So, it is actually imminent.

Option B: a quarterfinal match at next year's tournament. And option C: the final at the tournament to be held two years from now. So, next year, you can watch the quarterfinal. After two years, you can watch the final. Or you can watch a match tomorrow.

Ted and Matthew have identical tastes in tennis. If the matches were all for this year's tournament the utilities they would assign to them are as follows so you know normal match would give them a utility of 100 a quarter final match gives a utility of 150 and the final match gives a utility of 180. But in order to go to their favorite option, C, the final, they have to wait for two years. So let's see how they behave.

Now we will see their choices might differ depending on their discounting profile. So here we can see what is happening. First of all, this is Ted's valuation. These are utilities associated with the first round, quarterfinal, and final matches. After one year,

The 100 becomes, with a 10% discount, 90, and after 2 years, this is 81. In a similar fashion, the quarterfinal match becomes 150 minus 10%, 135, and then again 10%, 122. The final match: 180, 10% subtracted, 162; 10% subtracted from 162 is 146. Now, of all the options that are given, 146 is encircled because that is the largest number here provided that when each year passes by what are the options he is left with so after the first year,

of course, there is one 162 or one 180, they are not highlighted. You are actually not able to attend this match because this is not happening right now; it is available only after two years. So after two years, its value is 146. So of all the feasible values, this is the largest and that's why Ted would attend this. Now same is the case for Matthew also. First round matches are like he can watch the first round matches match after one year also.

The quarter final in the second year or what would be his value in the third year or after two years. And then this is available only after two years. So again, these are the feasible numbers which he can compare. And by comparing all of them, he also finds that 113 is the largest number. So he would also decide to watch the final match.

So if Ted had this choice, he would choose to wait two years and go to the final. Now, after a year has passed, If Ted is asked whether he wants to change his mind and go to option B, that is quarter final, he will say no, since 90% of the value of 162 is still greater than the value of B. This is what it means to have time consistent preferences. So again, if you look at it, you would still see that he would prefer,

Rather, what I would say is that after this, after one year, he would be having 150 and then 162 and 146. So, this is what is actually available. After one year, you can see that Ted is, this is the feasible set. So, either he can go for the first-round match and get 100 or 10%.

After one year, it would be 90, or he can go to watch the quarterfinal at 150, discounted by 10%, 135. This is still not available. So this is 162. This is still the largest one.

But what is happening in Matthew's case? So when first presented with a choice, Matthew would also choose option C, the final one that we have already discussed. But when the second year comes, then he has these three rounds of matches. And now this is 180. 180 minus 30%.

is 126. Similarly, 150 minus 30 percent, 105; 100 minus 30 percent, 70. So, being in the second year, when he again evaluates the options that are available in the next year, which was initially the second year, has become one year, he would say that the quarterfinal is giving him the largest value or utility. So, he would choose to watch the quarter final.

Now that is the point that unlike TED when a year passes Matthew will change his mind and switch to B in the quarter final because waiting for one year this counts the value of C by 70% to 126 which is less than 125 the current value of B. That's how Matthew is time inconsistent. Procrastination is another kind of time inconsistent behavior. Most of us procrastinate to file income tax returns.

Many of us eventually receive tax refunds and some refunds are substantial. However, waiting until the last minute can create a risk of missing the headline, missing information or committing the other errors leading to rejection. So there can be, you know, last minute hassles are always there. Further, last minute overloads of the offline as well as online submission points add to additional hassle. Ultimately, missing the deadline can result in financial penalties.

So why do so many procrastinate until the last minute? As teenagers and young adults, we are bombarded with the advice to never put off until tomorrow what you can do today. Nonetheless, procrastination seems to be ingrained into human behavior from our earliest opportunities to make decisions. We put off studying until we are forced to cram all night for the big test. We put off cleaning, maintenance or other work until we are forced into action.

Then we must complete a tremendous amount of work in a very short time. Procrastination becomes a problem when we prioritize activities that are not particularly important over

those that have real, if not immediate, at least long-term consequences. After one has been burned time after time by failing to study early or after a steady stream of financial emergencies that could not be covered by meager savings, it would seem like time to stop procrastinating. So, I will conclude this model with the introduction of basic forms of time inconsistencies, and I have also introduced very briefly the concept of

hyperbolic or quasi-hyperbolic discounting. So, in the next session, we will continue with similar examples, and then we will introduce one such model, which is the hyperbolic discounting model. These are the references used. Thank you.