

PRINCIPLES OF BEHAVIORAL ECONOMICS

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Week 46

Lecture 46

Welcome to the course on Principles of Behavioral Economics and this is lecture 46. We are currently discussing, or we are going to discuss, anomalies in the discounted utility model, or DUM in short. In the previous module, we talked about features of DUM, and prior to that, we also introduced the concept of DUM. Now, this module is actually going to talk about the instances broadly where it has been observed that the DUM is not found valid, or its principles are invalidated by certain behaviors or behaviors as portrayed by individuals.

Many anomalies in the DUM have already been noted in terms of the features of the model described earlier and the manner in which such features do not appear to be confirmed by empirical evidence. These anomalies relate to the sign effect, the magnitude effect, the delay speed up asymmetry, performance for improving sequences, the date-delay effect, the violations of independence, and preference for spread. These factors are now discussed in turn. But I will not be able to cover the last point, that is, violations of independence and preferences for spread, in this module.

We begin with the sign effect. This effect means that gains are discounted more than losses, as proposed by the prospect theory. For example, a study by Thaler in 1981 asked subjects, how much they would be willing to pay for a traffic ticket if payment could be delayed for periods of 3 months, a year, or 3 years. The responses indicated that people used much lower discount rates than in situations where monetary gains were involved.

So in case of monetary gains, the discount rates were larger which implies that they were more impatient while when it comes to monetary losses, then they were willing to postpone it. In many cases, the implied discount rate used by local government authorities is very large with fines often doubling in a matter of few weeks. The main problem with analyzing such a study would be the existence of confounding factors. In this case, people may forget to pay or delay payment in the hope of evading the fine altogether. If authorities fail to

follow up on all tickets issued so as you see that we are not delaying it or postponing it out of mere preferences

but rather it is quite unintentional at times like we may forget to pay. so this is what is a confounding factor at the extreme end of the loss discounting spectrum there are several studies that indicate that many people prefer to incur a loss immediately rather than delay it. This implies a negative discount rate for losses and an interpretation of this phenomenon is given in connection with the magnitude effect. Various theories accounting for the sign effect have been proposed.

Bilgin and Lebeau introduced the term temporal loss aversion as an explanation. In a series of experiments, these investigators found that intervals preceding losses seem shorter than intervals preceding gains and that this effect is driven by perceptions of the quality of the interval endpoint rather than by the quality of the interval itself. For example, a person moving to a new city in a couple of months time.

If the person is not looking forward to the move, the interval may appear to be shorter than it would be for the person who is looking forward to the move. We all remember that in childhood maybe we used to visit our close relatives houses during the vacation time and most of the time it would appear that the vacation ended very quickly. This is an example of sign effect because something we are actually enjoying and we do not want, we fear the vacation ending and as a result of which the vacation actually seem to end quickly. But in situations where we are bored, time seems to stretch out.

If the interval is perceived as shorter, then a smaller discount rate would be used. This temporal loss aversion may occur because the subjective effect is greater or because losses attract more attention than gains. There are other psychological factors related to this kind of loss aversion. One such factor is anticipatory utility or, in the case of losses, disutility. As we have seen earlier, people do not like the idea of a loss hanging over them and may prefer to endure the pain of the loss immediately and get it over and done with.

Thus, people are motivated to maximize savoring events that they look forward to and minimize the dread associated with unpleasant events in the future. So, Bilgin and LeBoeuf provide an evolutionary explanation for this phenomenon. When danger is imminent, it is likely more adaptive to err in the direction of exaggerating the proximity of the danger because perceiving dangers as temporarily near may galvanize necessary coping resources.

This is particularly true for unexpected dangers. Bilgin and LeBoeuf claim, and one of their experiments found, that unexpected losses loomed nearer than expected ones. So in the next I am going to talk about an experiment that has actually the impact of all these concepts of anticipation and anticipatory utility, dread and savoring. Anticipation of the future has an impact on immediate well-being. This observation can be traced to Bentham way back in 1789, who included among the ingredients of utility pleasures and pains that derive from anticipation.

For Bentham, anticipation, like consumption itself, was an important source of pleasure and pain. Jevons was one of the first to apply the Benthamite concept of utility to understanding intertemporal trade-offs. He defined three distinct ways in which pleasurable or painful feelings are caused. One, by the memory of past events. Two, by the sensation of present events.

And number three, by anticipation of future events. So these are the possible ways through which pleasurable or painful feelings are caused. Jevons termed the latter, that is the last one, as anticipal pleasure and anticipal pain. One of the most significant anomalies that DUM or exponential DUM cannot explain has to do with the increased utility generated by the expectation of a pleasurable event and with the reduced utility generated by the immediate realization of a looming unpleasant event.

So, this is claimed to be one of the most significant anomalies generated. Specifically, DUM fails to incorporate in its structure anticipatory pleasure or anticipatory pain. Loewenstein and Thaler in 1989 introduced the concepts of savoring which is like positive utility derived from anticipation of future consumption and dread which is negative utility resulting from contemplation of the future. An experiment was conducted with 30 graduates

where they were asked to specify the most they would like to pay. Most you would pay now to obtain or avoid each of 5 outcomes immediately and following 5 different time delays. The outcomes and the time delays are like this. So these are the outcomes. Obtain \$4.

Avoid losing \$4, avoid losing \$1000, avoid receiving a non-lethal 110 volt shock and obtain a kiss from the movie star of your choice. And the time delays are first of all immediately that is within 3 hours. then within 24 hours, in 3 days, in 1 year and in 10 days. Now, you see that these time delays apply to each and every outcomes. So, it is not that the outcomes and time delays are specific to each other.

So, for each and every outcome, there were this possible 5 time delays. According to exponential discounted utility model or DUM, given that the present utility of future gains and losses is reduced via the discount rate and if one can choose temporal allocations, one will try to realize gains immediately and allocate losses to the most remote future possible. So, in the DUM, there is a stream of utility and discounted till the last point. So, as you keep on discounting, the future utility becomes basically smaller and smaller.

So, of course, the painful things should be pushed to the end and the pleasurable things should be brought to the beginning. However, empirical tests tend to give the posit result. And now we are going to talk about the result of the experiment just explained. So, this is what is obtained or rather this is a graphical representations of the results obtained. We are measuring proportion of current value on the vertical axis and time delay, the 5 time delays like immediately and then within 3 hours, 24 hours,

Three days, one year and ten years. Now, actually, these things are not of much importance or concerns. What we would be actually focusing on the two instances where one is supposed to receive a kiss from the favorite movie star and the other one is the 110 volt non-lethal electric shock. DUM would suggest that you would have or prefer to have the kiss immediately and push off the shocks to the maximum possible delay. But what has been observed is that the proportion of current value that is if we begin with 1 then people were willing or valuing the kiss the most when they would obtain at on the third day or within

the three day or rather it is on the third day. This implies that they get some pleasure from the anticipation of the event. that's why they are pushing it further. On the other hand, if we look at the shock thing, then this is basically the amount that they are willing to pay in order to avoid it happening. The proportion of current value is the maximum when it is at 10 years, which means they wanted it ASAP. So painful events are brought forward and pleasurable events are actually pushed to some later date. So subjects on average were willing to pay the maximum to experience the kiss delayed by three days.

Similarly, the observations with respect to shock also contradicted the EDU. Next, we talk about the magnitude effect. Studies that vary outcome size often find that large outcomes are discounted at a lower rate than small ones. For example, In Thaler's study, subjects were indifferent between \$15 immediately and \$60 in a year, 4 times as much, \$250 immediately and \$350 in a year, which is 1.4 times as much,

much lower, \$3,000 immediately and \$4,000 in a year, which is 1.3 times as much. This phenomenon requires a psychological explanation, especially since the effect works in the opposite direction to the effect of diminishing marginal utility. If utilities were used to calculate discount rates instead of monetary values, then assuming the law of diminishing marginal utility applies, the differences in discount rates between small and large amounts would be even greater. A 2012 study found that there is also an interaction between the sign effect and the magnitude effect.

The discount rates calculated for Thaler's study above are based on the monetary values, not the actual utilities. They find that although large gains are discounted at a lower rate than small gains, large losses are discounted at a higher rate than small losses. For example, they find that \$10 loss is discounted by 6% over 6 months, while \$1000 loss is discounted by 13%. These are actually minus 6% and minus 13%. So, minus 13% over the same period.

They propose that both sign and magnitude effects can be explained by resolution theory. This emphasizes the importance of present bias, that is, consumers have a psychological desire to resolve both gains and losses immediately. We talked about closing and opening account while discussing mental accounting. So this has something to do with that concept we want to resolve issues immediately for gains people want the gain immediately to avoid the deprivation of waiting

and they also want to have any loss immediately to close their mental account on the loss and avoid the feeling of the loss looming over them in the future. The third anomaly we talk about is the delay speed up asymmetry. Studies have also investigated the effect of changing the delivery time of outcomes. These changes can be framed as either delays or accelerations from some reference point in time. For example, a 1988 study has found that subjects who did not expect to receive a VCR for another year

would pay an average \$54 to receive it immediately, which is a perceived gain. So the amount one is willing to pay to receive it immediately. However, those subjects who thought they would receive the VCR, so basically those who are expecting or anticipating that they would receive a VCR immediately, Demanded an average of \$126 to delay its receipt by a year. So now when you are expecting it to receive it and you do not receive it then you perceive it as a loss and as a result of which in order to compensate for the loss you are

a much larger amount compared to those who are asked to pay something in order to bring forward the event in time. Other studies have confirmed these findings in situations where the outcomes involved payments—that is, negative outcomes rather than positive ones like the delivery of a product. In these situations, subjects demand more to accelerate payment, a perceived loss, than to delay it, which is a perceived gain. We can note that these results are predicted by prospect theory. Two elements of the theory are involved.

They are reference points and loss aversion. The fourth anomaly we talk about is preference for improving sequences. The DUM predicts that total undiscounted utility being equal, people will prefer a declining sequence of outcomes to an increasing sequence. Since later outcomes are discounted more heavily. As a result, they would prefer a declining sequence of outcomes.

Thus, given the two consumption profiles 50-60-70 and 70-60-50 over three consecutive time periods, the DUM predicts that People will prefer the latter to the former. In contrast, many studies have shown that people prefer improving profiles. For example, Loewenstein and Sicherman have found that for an otherwise identical job, most subjects prefer an increasing wage profile to a declining or flat one. This makes perfect sense.

Over a period of time, you expect your wages to increase. A 1991 study found that an increasing salary sequence was rated as highly as a decreasing sequence that conferred a much larger monetary amount. In addition to these studies involving gains, some investigators have examined sequences of losses. Studies have found that subjects strongly preferred a sequence of decreasing discomfort to a sequence of increasing discomfort

even when the overall sum of discomfort over the interval was otherwise identical. So the amount of discomfort is the same; you want it in a decreasing sequence or an increasing sequence. people preferred it in a decreasing sequence in the sense they were willing to take maximum pain in the beginning Chapman investigated the responses of people to hypothetical sequences of headache pain with the sequences being matched in terms of total pain durations varied from one hour to as long as 20 years All durations between 82 and 92% of the subjects preferred sequences of pain that were declining rather than increasing.

So they wanted to have the pain as much as possible in the present time and the consecutive time. Thus, in general, for both gains and losses, people prefer an improving sequence to a sequence where outcomes are deteriorating. These findings are in line with various effects reported earlier, for example, expectation effects, anticipatory utility, and reference points.

So all conforming to different aspects of behavioral economics and, of course, contradicting what is described in traditional economics or the discounted utility model.

In particular, it is worth recalling the colonoscopy studies of Redelmeier and Kahneman where remembered utility which in turn may determine decision utility may differ from real time. We previously talked about some of the results of this colonoscopy study. Remember, utility or disutility may depend more on utility at the end of the sequence rather than at the start, as predicted by the peak-end rule. The next anomaly is the date delay effect. While all the effects described above involve objective changes and manipulations of outcomes and time periods,

recent research has also indicated that people may make different intertemporal choices when logically identical situations are presented or framed in different ways. So basically, here we are now going to focus on the impact of framing. Studies have found that people use lower discount rates in situations when time periods are described using end dates than when the same time periods are described as extents. For example, a study by LeBoeuf asked subjects the following two questions on the 15th of February. How much money would you want to receive in 8 months to be equivalent to receiving \$100 now?

So \$100 now or how much in eight months? The second alternative was: How much money would you want to receive on October 15 to be equivalent to receiving \$100 now? So the same question: \$100 now or how much on October 15? And October 15 is exactly 8 months from February 15. Although the two questions are equivalent in logical terms, it was found that people generally demanded a larger amount in answering the first question.

So when the extent is mentioned, they are asking for a larger amount. This implies a higher discount rate when a future gain is framed in terms of extent. So, as I explain the concept of discount rate, you can understand that if I have 100 equals to a larger amount in the numerator, then of course the discount rate also needs to go up in order for the equalization to hold. Discount rates are higher when the extent is mentioned.

Similar results are reported when outcomes are expressed as losses rather than gains, and in a number of experiments when the time intervals until outcomes occur vary between 2 months and 2 years. LeBoeuf proposes a psychological explanation for this phenomenon utilizing aspects of both prospect theory and mental accounting as follows. When consumers consider an interval demarcated by a date, the date may be construed as a relatively abstract point in time, and consumers may not even compute the interval's length. In contrast, when the same interval is described as an extent, that is, in terms of number of

months or number of weeks, by definition, the amount of time is highlighted, that is, after how long you are going to receive it.

Thus, consumers may attend more to interval length when facing an extent. If the interval length is perceived as being longer, it follows that a higher discount rate will be used. So, with this, I conclude the module on anomalies of the discounted utility model. One anomaly still remains to be discussed which from where I will pick up in the next module along with introducing certain concepts that are addressed by the behavioral economics and how behavioral economics is going to propose in the current structure in order to accommodate the anomalies that are observed.

Thank you.