PRINCIPLES OF BEHAVIORAL ECONOMICS

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Week 60

Lecture 60

Hello everyone, this is the final and 60th lecture of the course on Principles of Behavioral Economics. We are discussing behavioral games, and this is the last kind of game that I am going to discuss, which is trust games. Trust games are dictator games with an initial investment by an investor that determines how much the dictator or trustee has to allocate. The investor trusts that the trustee will give back enough to make her initial trust worthwhile. Trust games are simple models of contracting with moral hazard and no contractual enforcement.

The amount of investment measures trust. Repayment measures trustworthiness. So basically, when I am investing some amount of money, of course, we are now referring to informal sectors, but it can also, to some extent, be applied to formal sectors as well. The amount of money that I am investing indicates my trust in the system, and the amount of money that I am repaid or returned indicates the trustworthiness—how much it is worth trusting.

And as it is mentioned, trust games are simple models of contracting with moral hazard and no contractual enforcement. So when you talk about no contractual enforcement, then possibly we are more toward informal sectors. And the concept of moral hazard is basically the hazard that we would experience once we have selected something that is not trustworthy. We have in economics one concept called information asymmetry. Information asymmetry refers to a situation where

Parties involved in a transaction do not have equal information. So here, consider a seller and a buyer. The seller has more information about the product, about the prices, about the cost of production of that product compared to the buyer. So if the information available to both parties is not the same, then the individual or the party having more information is always in a position to exploit the other party. The seller can always charge a much higher price compared to its cost of production, provided that the buyer does not have actual

information. So, whenever there is information asymmetry, that leads to two situations or two outcomes, I would say.

One is called adverse selection. This happens before the transaction takes place. So adverse selection is basically selecting something which is adverse. So you decide to invest money somewhere, which is an adverse decision, which is not the right decision. And once you invest there, the next outcome is moral hazard.

That is, once you have invested and it actually was not a good decision. It was a problem of adverse selection. Then morally, you would have moral hazard in the sense that you're not going to get back your money. So there will be moral problems. Basically, this is what is referred to as moral hazard.

The centipede game is also a trust game with several stages. A multiplayer trust game is a gift exchange in labor markets. Firms offer wages to workers who accept offers and choose effort levels. Effort is costly to workers and valuable to firms but cannot be enforced by firms. So firms must trust workers to work hard.

Thus, there is no way to ensure that workers are actually putting in sufficient effort. These games are popular because they model key features of economic situations, and experiments are easy to run. Trust is an elusive concept that cuts across many disciplines. Marriage therapists talk about rebuilding trust after an affair. Sociologists are interested in how social networks reduce or inhibit trust.

Economists emphasize trust as a way of reducing transaction costs and lubricating the economy. This is basically if there is trust, then there is also trustworthiness. Historically, we have observed that having trust in certain entities is not a bad idea. This reduces transaction costs—the time and money spent on executing a transaction—and lubricates the economy, leading to its smooth functioning. If there are a large number of sectors or markets with significant information asymmetry, adverse selection, and moral hazard problems,

Then theoretically, it has been argued and empirically also observed that markets become inefficient. Markets at times also become non-existent. The situations, or in the situations where you really do not trust the seller of certain products. You would not prefer to buy, and there would be many who would not prefer to buy, as a result of which those markets would cease to exist. And that is why having trust is important—that it facilitates transactions, smoothens transactions, and that is what is referred to as

lubricating the economy. Whenever there are gains from trade, there is a productivity advantage to any institution or norm that assures traders that the other side will hold up their end of the deal. Legal contracts, third-party assurance—for example, a mutual friend vouches for the trustee's honor. Family solidarity and threats of violence can provide assurance, but they cost something. While trust is cheap, you really do not need to bring in so many things.

If you just trust and go ahead, and it turns out to be trustworthy, that's good for you. But then otherwise, trust does not involve so many things, and that's why it is cheap. Development economists and pundits think differences in trust, which alternatively can be called a kind of social capital, can explain why some countries or cultures are rich and others struggle. In the countries where there is more trust, and historically it has been observed that trust pays, then they tend to become culturally rich as well as economically rich.

as compared to countries where there is a lack of trust and of course lack of trust develops through historical observations or reputation. A large number of people find that trusting certain entities, organizations are not going to be beneficial, is not paying off, then that would lead to form a consensus. And as a result, there will not be much functioning or smooth functioning of the economy. We take examples of financial markets, for instance. In financial markets, all of you must be aware of the fact that there are regulations related to the requirement that companies must publish their profit and loss statements,

and their annual reports must include all financial details. That is done to ensure that parties involved in transactions have complete information about the company in which individuals are willing to invest their money. So if that kind of information is not available—if I do not know much about a company's financial condition—I will not be willing to invest in that company. So, in order to

incentivize me to invest in a particular company the company needs to provide me all possible information- correct information and as much information possible as about its financial conditions, right information which can actually help me take a call whether I should invest in that particular company or not. So the regulations in the financial markets basically to a large extent try also to remove information barriers, to remove information asymmetry. As information asymmetry is removed more and more people would have trust in the financial system and they would invest in the financial system. Investing in financial

system basically is good for the industry the economy flourishes and that's why the economy has the potential to become rich for example

Knack and Keefer in 1997 found a strong cross-country correlation between economic growth and the fraction of citizens who said they generally trust people. So, you can see that there is a strong cross-country correlation between economic growth and trust. Such explanations will live or die on accurate measurement of trust and social capital. But as Putnam laments in his 1995 work, 'since trust is so central to a theory of social capital, it would be desirable to have strong behavioral indicators of trends in social trust or misanthropy.' 'I have discovered no such behavioral measures.'

A beautifully simple game to measure trust was proposed by Berg, Dickhaut, and McCabe in 1995. In their game, the investor has X, which she can keep or invest. So, this is the initial amount or sum. Suppose she invests T and keeps X minus T for herself. The investment of T earns a return at a rate of 1 plus r and becomes 1 plus r multiplied by T.

Then the other player—the trustee, that is, with whom the investor kept or invested the money—must decide how much to share of the new amount which is 1 plus r multiplied by T with the investor. So now you just see one thing: The investment earns a return of 1 plus r, but this implies that the entire description suggests the investor did not know the rate of return and it is completely at the discretion of the trustee how much he or she is willing to return to the investor.

The trustee is playing a dictator game in which the amount to be allocated was determined by the trustee. Suppose she keeps Y and returns 1 plus R multiplied by T minus Y. So the investor gets 1 plus R multiplied by T minus Y, and the trustee keeps Y for himself or herself. Then the total payoffs are Y for the trustee and X minus T, which is basically the initial amount that she kept for herself, plus 1 plus R multiplied by T minus Y, so this is what she receives from the trustee for the investor. By simplifying this term, we get X minus Y plus RT. In this game, trust is the willingness to bet that another person will reciprocate a risky move at a cost to themselves.

Trust is risky because the investor will regret having entrusted if she does not get much back. T measures the amount of trust. The amount returned, which is 1 plus R multiplied by T minus Y, measures trustworthiness. If players maximize their earnings, the trustee will keep it all. The game has moral hazard or hidden action, which cannot be guaranteed contractually. Anticipating this, a self-interested investor should keep the money rather than invest it.

So if there is no trust, which implies T takes a value of 0, then the investor will keep X for herself and not invest anything. Trust must be risky. Trustworthiness must also go against the trustee's self-interest to test whether people are willing to sacrifice to satisfy a moral obligation. Sociologists and psychologists usually object that this game does not capture all there is to trust because the two-person, one-shot game does not include relationships.

Social sanctions, communication, and so many other rich features that may support or affect trust. That's precisely the point. The game requires pure trust. So, even if these factors can influence trust, the point is that we are not interested in considering them. Because if it is a complete process happening in the market, where there are no social sanctions, not much communication,

and no relationship between the trustee and the investor, then the point is how much the investor can trust the trustee. It also provides a plain benchmark against which trust under more complicated conditions can be compared, like a wire mannequin that can be dressed up with clothing. The trust game caught on quickly. Berg, Dickhaut, and McCabe in 1995 played it with an initial amount, which is like X equals $10. A rate of return equal to 2% and an elegant mailbox design to ensure double-blindedness.

Double-blindedness was discussed or explained previously, where basically the anonymity of the trustee and the investor is maintained. On average, investors put in about 50%. Five of 32 invested it all, and only two invested none. So here we have the graph of the trust game. As mentioned, initially they were given $10.

So 1, 2, 3, 4, 5 people invested all, and there were 2 individuals who invested none. You can see that the height of the bar measures total return. These circles measure the amount invested, and the black circles measure the payback. So, what we observe is that there are two situations where payback was equal to the amount invested.

There are a large number of situations where payback was less than—specifically, payback was less than what was invested. And there are situations where payback was greater than what was invested. The height of the bar, I repeat, represents the total return. Points are arranged from left to right according to the amount of the investment. The open circle in each bar shows what was invested.

That is the amount of T. So, for example, for 5 people, it was the entire $10. The height of the bar is the amount available to split, which is basically 3 times the initial investment.

So, as you can see, when it is 10, then it is 30. And in a similar fashion, when the numbers change, the height of the bar is always 10.

Three times the amount invested. The dark circle shows how much was returned. If the dark circles are above the open circles, then trust is repaid. So, for example, here the trust is repaid, that is the investor received some amount of money from the trustee. Here you can see the entire amount was returned.

And, of course, this is the only instance where the entire amount was returned. But most often, some amount of money has been returned. In Massachusetts, Ortman, Fitzgerald and Boeing experiment with variants of the Berg's design, prompting subjects by asking how much they expected and giving social history about what others had done. Investments ranged from 40 to 60 percent across treatments, and repayments averaged 110 percent. Koford found Bulgarian students were surprisingly trusting, investing 70% and getting 150% back.

Koford speculates that Bulgarians are used to trusting among themselves precisely because their trust in authorities is so low. Willinger, Lohmann, and Ususnir found that the French trusted much less than the Germans, but both nationalities returned about 40%. Ensminger found very little trust and trustworthiness among the Orma herders in Kenya. In figure, closed circles represent repayments greater than investment. So, where trust is paid, open circles represent payments less than the investment.

Now, this is the maximum payment line, the red line, and this is the repayment equal to investment line. So, These are the situations where trust is paid, and these are the situations where trust did not pay. The Orma invested 40% of 50 currency units, their currency units. Only one invested more than half, and they repaid only 55%, as most of the points are open circles close to the zero-repayment x-axis.

Next, we talk about multistage trust games very briefly. In multistage games, trust can usually be supported by repeated-game reputation building. So, multistage games are not evidence of blind trust and therefore make a different point. A centipede game is a multistage trust game in which players alternate moves. Each player can 'take,' ending the game and taking some percentage of the available surplus, or the player can pass,

increasing the surplus and allowing the other player a chance to take or pass. The game ends with a terminal node where one player must take. Because there is a terminal node, self-interested players will always take at the end. If players backward induct, this leads to

unraveling—taking at all nodes. The typical finding is that players pass until a couple of steps from the end.

Play in finitely repeated prisoner's dilemmas, a cousin of centipede games, is similar. So centipede games with finite moves have already been discussed, and this can be compared with a multistage game, trust game, or rather centipede games, as we are discussing. A kind of multistage trust game. And of course, as we can see, the outcome discussed here is pretty similar to what we discussed previously. Ho and Weigelt conducted four-move centipede games in which the surplus doubled with each move.

Players could take as much as they wanted at each node, and the terminal node was 0, 0. Subjects gave normal-form strategies; that is, they stated in advance whether they would take at each possible node. They conducted experiments in China, America, and Singapore, which is quite westernized—a convex combination of China and America. They observed much more self-interest than in other studies. About 30% of Player 1s took at their first node, while 50% of Player 2s took at their first node, and players took almost all the surplus—that is, 95%.

Rapoport and colleagues ran a three-person centipede game with nine nodes for very large stakes, where subjects could have earned fifteen hundred dollars if everybody cooperated. So it's actually a huge amount of money involved. Like Ho and Weigelt, they observed early taking, consistent with self-interest. One-third of the games ended at their first or second node. So these observations are pretty similar to what was observed previously. These two studies are inconsistent with what McKelvey and Palfrey found. The difference is probably due to the presence of a 0-0 terminal node.

In the study by Rapoport and colleagues, playing with two other players rather than one is a big psychological step because it requires a player to trust each of the two others. and to trust that the others both trust each other and so on. Now we will summarize key theoretical approaches underpinning behavioral games and compare the intuitions they embody. Several parsimonious theories have been proposed to explain a broad sweep of data with a single model of social preference.

In theories of pure and impure altruism, players care about the utilities of others or get satisfaction from treating others kindly. In inequality-aversion approaches, players care about earning more money and earning the same as others. In Rabin's reciprocal approach, players make a judgment about whether another player's action is kind or mean, that is, gives the target player a good or bad relative payoff and have a taste for reciprocating both

kindness and meanness with the same. Rabin's theory, developed for normal-form games, was extended by Dufwenberg and Kirchsteiger and by Falk and Fischbacher.

Most data support either inequality aversion or reciprocal approaches. Altruism theories do not explain both negative and positive behavior toward others without crudely changing the signs of coefficients exogenously. Inequality aversion theories are very promising—or rather, they are more promising—but predict a kind of separability. Utilities of terminal node allocations are independent of how those allocations arose and of allocations from unchosen alternatives. Reciprocal approaches get the psychology right.

So reciprocal approaches seem to have the best kind of explanation so far. The main argument in favor of inequality aversion is analytical simplicity. But the history of economic thought shows how quickly the profession can learn to use a tool that seems too unwieldy at first. After all, applying the reciprocity approaches to interesting games cannot possibly be more difficult than the incredibly complicated mathematics now being done in areas such as asset pricing, macroeconomics, epistemological game theory, and econometrics.

And we conclude by presenting a brief comparison of behavioral and standard game theory. So assumptions of standard game theory, first of all, people have correct mental representation of the relevant game. That is what we assumed. While in the case of behavioral game theory, denoted by BGT, we have representation, which basically tells us how a game is mentally represented.

Standard game theory assumes that people choose fully rationally, while in BGT, the focus is on initial conditions, that is, players' beliefs about the game situation, which could also be incorrect. The third one is that equilibria are reached instantly, and there is no learning from the game. While in the case of BGT, we allow for relevant or repeated games, so there is learning, and when learned, people can always improve. As we suggested, they can go for more and more cooperation. Number four, people are motivated purely by self-interest, as is expected from the very concept we initially introduced, icons.

While in BGT or behavioral game theory, we have the concept of social preferences. Individuals are not solely interested in themselves. They can also be interested in the betterment of others. Players have concerns about others' payoffs as well. So, this is how we present a brief comparison of behavioral and standard game theory, and with this, I conclude the discussion on strategic interactions.

On strategic game theory as well, the course ends with this discussion. These are the references used for this module. Thank you so much.