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The effect of high stakes on fairness concerns: Evidence from Mongolia

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Abstract

The paper investigates the effect of high stakes on fairness concerns in experimental economics. Using data from experiments involving the Sequential Prisoner's Dilemma Game in Mongolia, we analyse fairness concerns in a baseline game and a high stakes game. We estimate and test four different statistical models for examining the nature of fairness considerations. We find that cooperative behaviour of people reflects fairness concerns rather than unconditional altruism. The finding supports recent theoretical work, which pays great attention to positive reciprocation- fairness concerns rather than altruism or egoism. Furthermore, consistent with the results of recent experiments, which employ an ultimatum game, a dictator game, and a gift exchange game, we find that high stakes have no impact on the fairness concerns. Moreover, in the presence high stakes, raised by a factor of 10 over baseline payoffs, we observe significantly higher unselfish behaviour, overall. Consistent with the results of classic experiments in the Prisoner's Dilemma Game, we detect that cooperation rates decline with repetition. Our results also suggest that Mongolian subjects are more cooperative than the subjects of the UK and USA. Finally, we also find behavioural differences, an avenue for future research, in the data.

Introduction

A substantial amount of evidence has been accumulated during the last decade indicating that fairness concerns affect economic agents' behaviour. This experimental economic evidence, gathered by a number of laboratory experiments and some theoretical models, has generated a significant literature regarding the nature of fairness since economic agents are consistently willing to sacrifice personal material payoffs for fairness considerations. The evidence doesn't support the *traditional theoretical assumption of pure selfishness and rationality*, which is maintained in almost all economic models.

More recently, the question of how fairness concerns response changes in economic incentives has become the focus of the theoretical research and laboratory experiments. Particularly, the effect of high stake has become the subject of the extensive economic and game theoretical literature. Dozens of experiments conducted to test the effects of increases in the scale of material payoffs on fairness considerations. Most of them, however, employed an ultimatum, a dictator or a gift exchange games. For instance, Cameron (1995), Hoffman et al. (1996), Slonim and Roth (1998), and Fehr, Fischbacher and Tougareva (2002) conduct experiments to check subjects' behaviour in the higher stake condition by using above named games. However, there are not many laboratory experiments, in which the Prisoner's Dilemma or the Sequential Prisoner's Dilemma games are used, to consider particularly the higher stake effect on fairness concerns.

It is well known that the Prisoner's Dilemma game is an important paradigm that not only economists and game theorists but also other social scientists use in the analysis of strategic situations. The presence of cooperation in the Prisoner's Dilemma games expresses an interest in behaving unselfishly. The explanations of why people cooperate in the Prisoner's Dilemma Games have been essentially focused on the psychological factors of reciprocity, altruism and learning. Kreps et al. (1982), Selten and Stoecker (1986), Andreoni and Miller (1993), DeJong, Forsythe and Ross (1996) and many others conduct experiments to isolate the factors which motivates cooperation in the Prisoner's Dilemma games.

Moreover, the theoretical approaches, which incorporate fairness concerns into the Prisoner's Dilemma and related games, have been developed. For example Rabin (1993) develops the concept of fairness equilibrium, based on the idea that people like to help those who help them and hurt those who hurt them. His model has been a starting point for a variety of analysis in the Prisoner's Dilemma game. Dufwenberg and Kirchsteiger (1998) develop Rabin's (1993) theory of reciprocity for extensive games and propose the sequential reciprocity equilibrium, can be applicable to sequential games such as the Sequential Prisoner's Dilemma. Nelson (2002) proposes an augmented version of Rabin's (1993) utility function that provides helpful implication for the interpretation of Prisoner's Dilemma experiments.

Having argued that the Sequential Prisoner's Dilemma Game is more convenient to studying other-regarding behaviour than the more familiar simultaneous version of the game, Clark and Sefton (2001) carry out experiments to examine how fairness concerns influence individual behaviour in social dilemmas. Their results support the argument that cooperative behaviour in social dilemmas reflects positive reciprocation-fairness consideration rather than altruism. Doubling their payoffs of baseline models, they inspect the effect of high stake on reciprocation and find the effect of high stake is insignificant. Apart from this attempt, no experiment conducts to test the effect of high stakes on fairness concerns by using the Prisoner's Dilemma or the Sequential Prisoner's Dilemma games.

We conduct experiments to examine the high stake effect on fairness considerations by employing a version of the Sequential Prisoner's Dilemma games in which the payoffs are increased by a factor of ten. In this paper, we provide experimental evidence on the nature of fairness consideration, and how subjects' behaviour is influenced by high stake. By using 800 observations, made by Mongolian subjects, we estimated 4 different models to statistically examine the nature of fairness concerns. We find that the opponent (the first mover) choice has significantly positive effect for likelihood of the second mover cooperation. This result confirms Clark and Sefton (2001)' s finding that shows the first mover's choice is the most important variable influencing cooperation. Hence, our result supports the argument that cooperative behaviour reflects fairness consideration. We also observe the fact that trend of cooperation rates decline over the rounds. This is consistent with the previous findings of many experiments examining cooperation in one- shot and finitely repeated Prisoner's dilemma games. We further analyse the aim of our experiment- the effect of high stake on fairness consideration. Consistent with the Nelson's (2002) augmented utility function and results of the other experiments in an ultimatum, a dictator, and a gift exchange games such as Slonim and Roth (1998), Cameron (1995) and Fehr, Fischbacher and Tougareva (2002), we find that higher stake has no impact on the agents' unselfish behaviour. The result is also consistent with the outcome of the Clark and Sefton (2001) experiment. Moreover, we find that Mongolian subjects more likely to cooperate than the subjects in the UK and USA experiments, which are conducted by Clark and Sefton. Even though we cannot be certain, we suspect that there might be institutional factors left over from the communism in Mongolian subjects.

The remainder of the paper proceeds as follows. In section 1, we discuss the Prisoner's Dilemma game briefly. In section 2, we consider fairness concerns and fairness models. In section 3, we present our experimental design, procedures, and methodology. We also specify simple probit and the random effect probit models and present the estimates and regarding test results. We, in section 4, summarise our results and findings and conclude finally.

***Section 1*. The Prisoner's Dilemma Game**

Recent developments in game theory have built on the memory of its beginnings. Although the history of game theory can be traced back earlier, the key period of its emergence was the decade of the 1940's. The publication of *The Theory of Games and Economic Behaviour* was a particularly important step. Von Neumann and Morgenstern's book, published in 1944, made great advances in the analysis of strategic games and in the axiomatisation of measurable utility theory and drew the attention of economists and other social scientists to game theory.

Albert W. Tucker's invention of the Prisoner's Dilemma, in 1950, was another most important advance in the history of game theory. This example, which can be set out in one page, is now considered as the most influential one page literature in the social sciences in the latter half of the twentieth century. Merrill Flood first drew attention to this peculiar game in 1950 and it was later formulated and given the name "Prisoner's Dilemma" by Tucker. The Prisoner's Dilemma has become an important paradigm that economists use in the analysis of a wide variety of strategic situations and there has been a long tradition of Prisoner's Dilemma experiments in economics as well as in social psychology since the early 1950's.

The game arose not in a research paper, but in the classroom. Tucker's simple explanation has since given rise to a vast body of literature in subjects as diverse as philosophy, ethics, biology, sociology, political science, economics, and game theory.

The Prisoner's dilemma derives from the following imaginary strategic interaction. Two people are arrested and charged with involvement in a serious crime. They are held in separate cells and prevented from communicating with each other. Each prisoner is faced with a choice between concealing information from the police (not confess) and disclosing it (confess). We can represent the game compactly by a payoff-matrix table with a>b>c>d. (Table 1.1).

Let an individual player in a game evaluate separately each of the strategy combinations he may face, and, for each combination, choose from his own strategies the one that gives the best payoff. If the same strategy is chosen for each of the different combinations of strategies the player might face, that strategy is called a "dominant strategy" for that player in that game.

Table 1-1

		Person 2	
		Not confess (cooperate)	Confess (defect)
Person 1	Not confess (cooperate)	b, b	d, a
	Confess (defect)	a, d	c, c

The "dilemma" is that it is a dominant strategy for each person to confess[1], since c>d, and a>b even though this is clearly inferior to each player not confessing. A strategy is said to be strictly dominated if another strategy always gives improved payoffs whatever the other player in the game does. The principle of strict dominance argues that person 1 should confess. The reason for this is whatever person 2 decides to do, person 1 always better off confessing. The same logic applies equally to person 2 and strict dominance predicts that he will also confess. If, in a game, each player has a dominant strategy, and each player plays the dominant strategy, then that combination of dominant strategies and the corresponding payoffs are said to constitute the dominant strategy equilibrium for that game. Therefore, the only equilibrium in this game is that dominant strategy equilibrium at which both prisoners confess and receive the non- Pareto optimal payoff of c each. In fact neither players confesses, both would be better off. As at least one of the players in this game can, with a different outcome, be made better off without the other person being worse off, this solution is said to be Pareto inefficient. This remarkable result that independent rational action results in both persons being made worse off in terms of their own self-interested purposes is what has made the wide impact in modern social science.

[1] Th strategy 'not confess' is called 'cooperate' and 'confess' is called 'defect' in much of the literature

A Nash equilibrium, a very important concept in game theory and economics, captures the idea of equilibrium. Both players know what strategy the other player is going to choose, and no player has an incentive to deviate from equilibrium play because his strategy is a best response to his belief about the other player's strategy in a Nash equilibrium. To find a Nash Equilibrium in the Prisoner's Dilemma Game, we apply following two stage methodology. Firstly, we need to identify the optimal strategies for each person, dependent upon what the other person might do. If person 1 expects person 2 to confess, then person 1's best strategy is also to confess because c is better than d (c>d). We underlined this payoff element for person 1 in the cell corresponding to both prisoners confessing in Table 1.1. If person 1 expects person 2 to not confess, then person 1's best strategy is still to confess because a is better than b (a>b). We also showed this by underlining this payoff element for person 1 in Table 1.1. The same analysis is undertaken for person 2 and his best strategy payoffs (c and a) are underlined as well. Secondly, we find out whether a Nash equilibrium exists by examining the occurrence of the previously identified optimal strategies. If all the payoffs in a cell are underlined, then that cell corresponds to a Nash equilibrium. This is true by definition we drew earlier, since in a Nash equilibrium all players are playing their optimal strategy given that other players also play their optimal strategies. We can notice that only one cell has all its elements underlined in the Prisoner's Dilemma Game. (see Table 1.1) This corresponds to both persons confessing, and so this is the unique Nash equilibrium for this game.

Section 2. Fairness concerns

2.1. Fairness concerns in literature

Concerns about fairness are present in many different economic environments, and the desire to achieve a 'fair' outcome has been offered as an explanation for many outcomes that do not support the theoretical prediction of purely self-interested utility maximisation. In fact, a large body of experimental economic evidence has generated a significant literature regarding the nature of fairness in non-hypothetical environments since subjects are consistently willing to sacrifice personal material payoffs for fairness allocations. Guth, Schmittberger, and Chwarze (1982), Kahneman, Knetsch, and Thaler (1986), Rabin (1993), Forsythe et al. (1994), Andreoni (1995), Roth (1995), Clark (1998), Dufwenberg and Kirchsteiger (1998), Falk and Fischbacher (1998), Clark and Sefton (2001), and Andreoni and Vesterlund (2002) explicitly build tastes for fairness concerns into a game theoretic framework. The theoretical literature in fairness has shown that there are many potential fair allocations with each meeting a different set of widely accepted axioms such as freeness, anonymity, and Pareto optimality. The theoretical literature on fairness makes it clear that in any situation there are many allocations that could be considered fair. The conclusion from the existing empirical literature is that a dominant fairness concept does not exist and that fairness concepts differ with the context of the situation and with the individual.

Konow (1996) argues that the dispersion in fairness concepts is not that chaotic. His argument is that people when determining a fair allocation are influenced by three key items – accountability, altruism, and efficiency. The dispersion in what people report as fair stems from people weighing these criteria differently when making their decisions. Other theoretical models define fairness on the basis of reciprocity (Rabin 1993), or comparative payoff outcomes (Fehr and Schmidt 1999; Bolton and Ockenfels 2001). Konow (1996) also argues that concerns for reciprocity should not affect third party decision-making, and concerns for egalitarian outcomes would imply equal outcomes as a focal point for third party allocations.

Konow's (1996) ' accountability principle' states that equal distribution is fair if the individual with more has earned his superior position. Konow's (1996 and 2000) original survey results and more recent experimental results support the accountability principle, as do results from a variety of other studies such as Clark (1998). In his more recent work, Konow (2000) conducted a dictator game experiment where benevolent dictators allocated a fixed payout between two subjects in proportion to 'credits'. He found that when credits were arbitrarily assigned, dictators ignored the distribution of credits when credits obtained through effort, they allocated in proportion to 'credits'.

Fairness concepts may also differ across individuals. Culture, background, and other personal characteristics may influence an individual's morals and values and, therefore, his or her notion of fairness. Evidence from the different literature on fairness finds that gender, education, and cultural background affect what an individual thinks is fair. Croson and Buchan (1999) find that women reciprocate more than men in East Asian countries, and in the United States, Eckel and Crossman (in press) survey numerous studies that have shown somewhat mixed gender effects, but their results indicate that women are less selfish than men in double-anonymous dictator games. Furthermore, Andreoni and Vesterlund (2001) find that women are more likely to equalize payoffs and that men are more likely to maximise total payoffs in their modified dictator game. The weight of the evidence points toward women being more interested than men in equalising payoffs. Their results indicate that the question 'which is the fair sex?' has a complicated answer –when altruism is expensive, women are kinder, but when it is cheap, men are more altruistic. Dickinson and Tiefenthaler (2002) find empirical evidence from controlled laboratory experiment where third party decision makers allocate resources between two individuals. The experimental results indicate that subjects view a wide range of different allocations as the fair distribution resources. However, their regression analysis indicates that both treatment effects and a few demographic variables explain some of this variation in fairness concepts. Most significantly, decision makers, from their empirical results, rewarded subjects who earned their favourable positions, and the gender of the decision maker was an important predictor of the allocation chosen.

2.2. *Fairness Equilibrium*

There are several alternative approaches that try to account for persistent deviations from the predictions of the self–interest model by assuming a different motivational structure. The approach pioneered by Rabin (1993) emphasises the role of intentions as a source of reciprocal behaviour. Rabin's approach has been extended in interesting ways by Falk and Fischbacher (1998), Dufwenberg and Kirchsteiger (1998), and Clark and Sefton (2001). Andreoni and Miller's (1993) model is based on the assumption of altruistic motives. There is another approach by Bolton and Ockenfels (1997), and Fehr and Schmidt (1999) based on the assumption of altruistic motives.

Rabin (1993) develops the concept of fairness equilibrium, based on the idea that people like to help those who help them and hurt those who hurt them. His model demonstrates some general implications of fairness on game theory and economics. Economic analysis, in fact, starts with the assumption that people are both self-interested and rational. Contrast to this assumption, people may care not only about their own well-being, but also about the well-being of others. This is called simple altruism in Rabin's (1993) original work and pure altruism in Andreoni and Miller (1993). However, as Rabin emphasises altruistic behaviour is very complicated and people just simply want to help other people; instead they help others if other people help them. Indeed, as Rabin writes, on the one hand, altruistic people help other altruistic people and on the other hand, they tend to hurt those who hurt them.

Simply, we can define fairness as follows. If somebody is being kind to you, fairness dictates that you be kind to him. If somebody is being unkind to you, fairness dictates that you be unkind to him. In his paper, he develops a game-theoretic framework, which incorporates the following three stylised facts:

(A) People are willing to sacrifice their own material well-being to help those who are being kind.

(B) People are willing to sacrifice their own material well-being to punish those who are being unkind.

(C) Both motivations (A) and (B) have a greater effect on behaviour as the material cost of sacrificing becomes smaller.

He presents some general results about which outcomes in economic situations are likely to be fairness equilibria and shows the special role of 'mutual-max' outcomes[2] and 'mutual-min' outcomes [3].

As he emphasises, the following results hold:

(1) Any Nash equilibrium that is either a mutual-max outcome or mutual-min outcome is also a fairness equilibrium.

(2) If material payoffs are small, then, roughly, an outcome is a fairness equilibrium if and only if it is a mutual-max or a mutual-min outcome.

(3) If material payoffs are small, then, roughly, an outcome is a fairness equilibrium if and only if it is a Nash equilibrium.

Rabin (1993, p.1282)

[2]– outcomes when each person maximises the other's material payoffs given the other person's behaviour

[3]– outcomes when each person minimises the other's material payoffs given the other person's behaviour

In the Prisoners' Dilemma Game, Rabin shows that fairness may lead each player to sacrifice to help the other player. Consider the following Prisoner's Dilemma as an example of fairness equilibrium. (Table 2.2, in next page)

Firstly, consider the cooperative outcome, (cooperate, cooperate). If it is common knowledge to the players that they are playing (cooperate, cooperate), then each player knows that the other is sacrificing his own material well-being in order to help him.

Table 2-2

		Player 2	
		Cooperate	Defect
Player 1	Cooperate	400, 400	0, 600
	Defect	600, 0	100, 100

Table 2.2 is a payoff -matrix where 0, 100, 400, and 600 are payoffs[4].

Each will thus want to help the other by playing cooperate, as long as the material gains from defecting are not too large. Thus, if payoff is small enough, (cooperate; cooperate) is a fairness equilibrium. For any payoff, however, the Nash equilibrium (defect, defect) is also a fairness equilibrium. This is because if it is common knowledge that they are playing (defect, defect), then each player knows that the other is not willing to forgo 100 in order to give the other 600. Thus, both players will be unkind; in the outcome (defect, defect), each player is satisfying both his desire to hurt the other and his material self-interest. In this case, both (cooperate, cooperate) and (defect, defect) are fairness equilibria. People sometimes cooperate, but if each player expects the other player to defect, then they both defect.

Suppose that player 1's concern for player 2 was independent of player 2's behaviour. Then if he thought that player 2 was going to choose 'cooperate', he would play cooperate if and only if he were willing to give up 200 in order to help player 2 by 400; if player 1 thought that player 2 was playing defect, then he would play cooperate if and only if he were willing to give up 100 in order to help player 100 by 500. Clearly, then, if player 1 plays cooperate in response to cooperate, he would play cooperate in response to defect. In order to get the two equilibria, player 1 must care differentially about helping (or hurting) player 2 as a function of player 2's behaviour.

Rabin suggests that player 1 has a positive sympathy coefficient $\alpha > 0$ when player 2 kindly helps 1; conversely, $\alpha < 0$ when player 2 behaves meanly by choosing an action that hurts 1. Rabin assumes these feelings add to utility from money

[4] -for simplicity, we use numbers as payoffs. In his original work, Rabin used payoffs, which were dependent on X variable-a positive number.

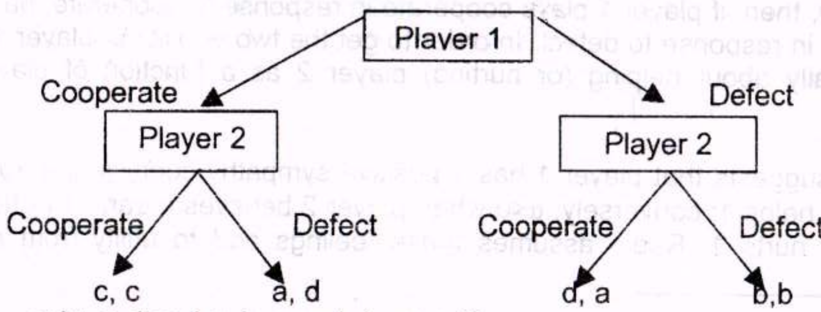
payoffs, but become relatively less important as money payoffs rise. These assumptions lead to 'fairness equilibrium'. In a prisoner's dilemma game, as we defined earlier, a rational player recognises that regardless of whether the other player defects or cooperates, the rational act to defect. However, when both players follow this logic, they end up worse off than if they could have agreed to cooperate. In experimental games, players seem unexpectedly skilful at avoiding the dilemma and finding their way to cooperation. The concept of fairness equilibrium helps to explain why. At least for small stakes, cooperation in a prisoner's dilemma is a fairness equilibrium. Finally, cooperating means sacrificing to help another person, which triggers a reciprocal preference to cooperate. Cooperation is emotionally strategic in this approach, transforming the prisoner's dilemma into a coordination game in which players desire to a coordination game in which players desire to coordinate their levels of niceness. Sally (1995) observes the fact that players who expect others to cooperate are more likely to cooperate themselves.

The second issue that the prisoner's dilemma illustrates is the role of intentionality in attitudes about fairness. Psychological evidence indicates that people determine the fairness of others according to their motives, not solely according to actions taken. In game theoretic terms, 'motives' can be inferred from a player's choice of strategy from among those choices he has, so what strategy a player could have chosen (but did not) can be as important as what strategy he actually chooses. For example, people differentiate between those who take a generous action by choice and those who are forced to do so.

Extending Rabin's model to sequential games is also essential for applied research. Dufwenger and Kirchsteiger (1998) develop Rabin's (1993) theory of reciprocity for extensive games. Moreover, they propose a new solution concept, which is called the sequential reciprocity equilibrium, can be applicable to sequential games such as the Sequential Prisoner's Dilemma.

Clark and Sefton (2001) also use a sequential version of the Prisoner's Dilemma where the first mover chooses to cooperate or defect, and after observing this choice the second mover responds with either cooperate or defect. (Figure 1.1) They argue that, in sequential games, players may revise their beliefs as play unravels, and kindness depends on beliefs, the nature of reciprocity concerns may have to be revised accordingly.

Figure 1.1. A Payoffs Tree in A Sequential Prisoner's Dilemma



a>b>c>d and a, b, c and d - payoffs.

The Sequential Prisoner's Dilemma game is an example of extensive form game. In extensive form games, greater attention is placed on the timing on decisions to be made, as well as on the amount of information available to each player when a decision has to be made.

Clark and Sefton (2001) examine how fairness concerns influence individual behaviour in social dilemmas by using a sequential prisoners' dilemma experiment. In their paper, they analyse the extent to which cooperation, repetition, economic incentives, subject pool (United Kingdom vs United States) and gender. By having subjects play a series of sequential prisoner's dilemma games, they find the most important variable influencing cooperation is the first mover's choice. Their results support the argument that cooperative behaviour in social dilemmas reflects reciprocation rather than altruism. Having studied experiments carried out by Clark and Sefton (2001) and a theory developed by Dufwenberg and Kirchsteiger (1998), it can be concluded that the Sequential Prisoner's Dilemma Game is more convenient to studying other-regarding behaviour than the more familiar simultaneous version of the game.

Therefore, our experiments in Mongolia were conducted by using the Sequential Prisoner's Dilemma and similar methods employed in their model and experiments. In next section, we investigate the fairness concerns in Mongolian data by using Clark and Sefton (2001) model as a benchmark model.

The fairness equilibrium models are a solid new platform for understanding departures from self-interest in games and economics. The models capture basic facts that the simpler and comparative models do not capture, particularly the reciprocal nature of social values and the distinction between uneven outcomes and unfair actions.

***Section 3.* Mongolian Experiment**

3.1. Experimental Design and Procedures

The experiments were conducted at The National University of Mongolia in May 1998. Four experimental sessions were completed and for those sessions 80 subjects were recruited from a wide variety of undergraduate courses. Two baseline sessions, with the exactly same payoffs, were played and 20 students participated in each of them. The actual baseline game played by subjects in these experiments is shown in Table 3.1.

Table 3.1 Baseline game

		Second mover	
		Cooperate	Defect
First mover	Cooperate	400, 400	0, 500
	Defect	500, 0	100, 100

The payoffs are points that directly convert to money via an experimental exchange rate.

The question how the relationship between material and fairness concerns affected by change in some of or all of the payoffs in the Prisoner's Dilemma has been an important experimental issue for economists.

In our experiment, we increased all Baseline game payoffs drastically so that payoffs in High stake games (Table 3.2) are ten times greater than those in our Baseline games.

Similarly to the Baseline games, 40 students (20, 20) played two high stake sessions where the payoffs were identical. In order to analyse the effects of high stakes on fairness concerns, we applied following high stake game where the payoffs of baseline game, depicted in Table 3.2, are increased by a factor of ten. The payoffs in this game, therefore, can be considered as high stakes, particularly, converting to monetary terms, in a country where income is low.

Table 3.2. High stake game

		Second mover	
		Cooperate	Defect
First mover	Cooperate	4000, 4000	0, 5000
	Defect	5000, 0	1000, 1000

The fairness component is independent of the scale of payoffs in Rabin's (1993) model. Therefore, the fairness component would be unchanged in any changes of the material components, namely payoffs. From Rabin's point of view, for sufficiently high stakes, the material component dominates the utility function and thus the impact of fairness on the players' strategies diminishes. Therefore, a Nash equilibrium outcome- mutual defection would be the only equilibrium.

Contrastingly, Nelson (2002) suggests augmented utility function in which the material and fairness concerns' interaction is generalised and argues that when the stakes very high or very very high, subjects' behaviour can be dominated by the fairness.

Hence, from the theoretical point of view, we cannot be sure about how high stakes affect the trade-off between material and other regarding concerns. Also, in the experimental literature, there is no agreement on the high stake effect on the fairness concerns at all. The main purpose of our experiments, therefore, is to examine this argument.

In our experiments, we specifically limited the extent to which we recruited students from economics courses in order to avoid recruiting subjects who might have prior exposure to game theory or economics. Subjects were selected from respondents to posters which advertised an opportunity to earn cash by participating in a decision making experiment. 20 subjects for each session or overall 80 for 4 sessions, providing a total of 800 observations, took part in the experiment at the same time. Subjects were seated 10 by 10 at separate rooms and given a copy of the instructions, which are included in an Appendix. The instructions explained the

rules by which subjects were matched, made choices, and received payoffs. Since these instructions were also read aloud, we assume that the information contained in them is common knowledge. An experiment in each session consisted of ten rounds. In each round, subjects paired with other subjects who were in the other room. Cooper et al. (1991, 1996) applied this matching scheme firstly and Clark and Sefton (2001), in our benchmark model, employed it as well. As long as a subject paired with a subject in the other room, no subject knew the identity of the subject whom he currently paired or the history of decision made by any of the other subjects. After each round, moreover, a subject played with a different subject in other room. The reason why subjects were not paired together more than once was to encourage subjects to view each game as a one-shot game rather than as a single round of a repeated game. Therefore, we argue that reputation effects from repeated play against a fixed opponent are not relevant in this matching design. During the sessions, subjects were prohibited to communicate and there was no communication between subjects, apart from the transmission of formal decisions via a Go Between.

We carried out a survey for obtaining a monthly average income of Mongolian students before the experiments. More than 30 randomly selected students took part in our survey and we found that the average income of Mongolian students per month was 27,000 tugrugs. The national average wage rate per month and the average tuition for higher education per year were respectively 48,100[5] tugrugs and 214,000[6] tugrugs at the time of the experiment. Using Mongol bank's (Central Bank) official exchange rate for $1 = 821.41tugrug[7], we converted the income of Mongolian students per month, the national average wage rate per month and the average tuition for an academic year into USD and found $32.90, $58.60 and $ 260.50 respectively. We used these average values to define reasonable payoffs in our experiments.

Each subject started the experiment with an initial balance of 2000 points that was worth of 400 tugrugs in a session. In each round, the subject earned additional points depending on the decisions made by him and the person he was paired with.

At the end of experiment, subjects received 100 tugrugs for every 500 points they earned. Sessions lasted approximately an hour, and the subjects earned an average of 2354 tugrugs or $2.87. However, the earnings were quite different in different sessions. It is easily noticeable that the average earnings in the same games are significantly different. For example, the difference of the average earnings between High stake I and High stake II sessions is 1060 tugrugs (32% by percentage) and the difference of average earnings between Baseline I and Baseline II is 389 tugrugs (54.5% by percentage). Therefore, we can conclude that the behaviours in sessions are extensively different.

[5]- Source: Consumer price survey of Mongolian National Statistical Office, 1998

[6] -Source: Wage survey of Mongolian National Statistical Office, 1998

[7]- Source: Monthly Bulletin, The Bank of Mongolia, May/1998

Even though an average earning equals one or two hours wage in similar experiments that were conducted in the UK or in the USA, the average subject earning in Mongolia, $2.87, can be considered as high in the country where income is very low and USD is strong. For example, subject earnings averaged J9.05 in the United Kingdom and $12.66 in the United States in the experiments of Clark and Sefton (2001).

Table 3.3. Subjects' average earnings by sessions

	Session 1 (High stake I)	*Session 2 (High stake II)*	*Session 3 (Baseline I)*	*Session 4 (Baseline II)*
Average earning (by tugrug)	*4380*	*3320*	*1103*	*714*
Average earning (by USD)	*5.33*	*3.92*	*1.34*	*0. 87*

As we mentioned earlier, we employed a Sequential Prisoner's Dilemma game where the first mover chooses to cooperate or defect, and after observing their opponent's choice, the second mover responds with either cooperate or defect. In the sequential Prisoner's Dilemma, second movers respond to observed choices so that we can directly test whether they condition on first movers' choices. In our experiment, we analysed second mover's behaviour, which can be summarised by following observations using Dufwenberg and Kirchsteiger (1998) method.

A) If the first mover defects, the second mover also defects in the fairness equilibrium. To examine this, let's consider the payoff matrix in Table 3.2

Only the reciprocity payoff can conceivably make the second mover choose 'cooperate', as the material payoff dictates a choice of to defect for the second mover. When the first mover chooses 'defect', the second mover gets less than when the first mover chooses 'cooperate'. From Table 3.1, we can easily check that if the first mover chooses to cooperate, the second mover can earn either 400 or 500, while he earns 100 or 0 in if the first mover chooses to defect.

Whatever the first mover believes about the second mover's strategy, the first mover's choice of 'defect' is unkind, and hence the second mover believes that the first mover is unkind. Thus, the reciprocity payoff as well as the material payoff makes the second mover choose 'defect'. Therefore, a second mover's defection conditional on first mover's defect choice is a fairness equilibrium.

B) If a first mover cooperates, second mover can give points of at least 0 or at most 400 to a first mover. We can see that 'fair' payoff is 400 so that 'fairness equilibrium' is 'cooperate, cooperate' or '400, 400' outcome where a second mover's cooperation is conditional on the first mover's cooperate choice. Hence, second mover's kindness of cooperation equals 400 and on the other hand, his kindness of defection is worth of 0. To estimate how kind second mover believes a first mover after his cooperative choice, we have to specify, according to Dufwenberg and Kirchsteiger (1998) method, a second mover's belief of a first mover's belief about a second mover's choice after his cooperative choice. Because, a second mover has to

make decision after a first mover so that he already knows what choice a first mover has made, and hence a second mover's belief must be appropriate to his knowledge.

3.2. Results

3.2.1. Overview

We begin with an overview of the cooperation rates observed in sessions and then provide some econometric evidence. Table 3.4 presents the proportions of cooperative choices in sessions. The strongest evidence that fairness is at least part of the explanation for observed cooperative play comes from these games. If players are egoists, cooperation will not be observed in the one-shot Prisoner's Dilemma games. Over the entire 800 observations, proportions of cooperative choices were greater than 20 in all sessions of games (except High stake II) and in all rounds. We found some very interesting and unexpected outcomes in our experiments. For instance, an unexpected high proportion of cooperative choices, at least 80 percent and at most 95 percent in the rounds, occurred in Baseline I game.

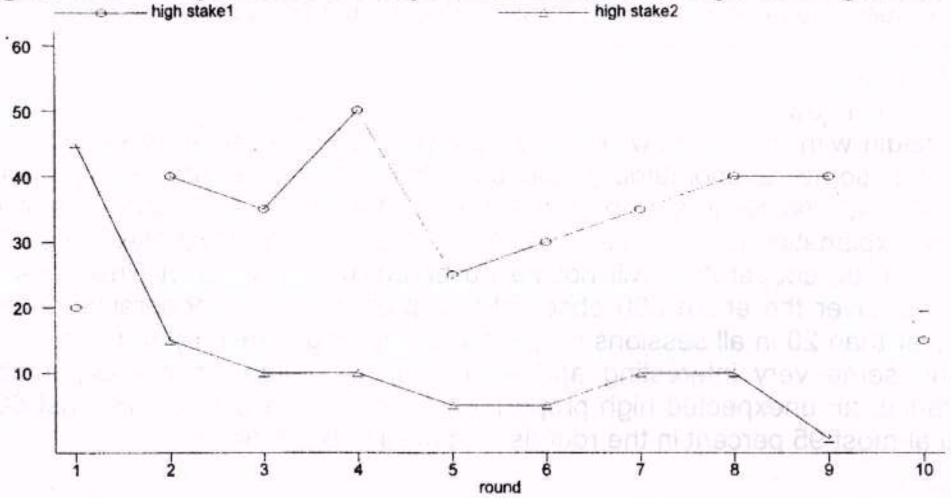
Table 3.4.
Proportion of Cooperative choices (by %)

	Round 1	*Round 4*	*Round 7*	*Round 10*
Overall	*51.25*	*43.75*	*36.25*	*33.75*
High stake I	*20*	*50*	*35*	*15*
High stake II	*45*	*10*	*10*	*20*
Baseline I	*95*	*95*	*80*	*80*
Baseline II	*45*	*20*	*20*	*20*

From Table 3.4, we can see that cooperation rates are declining over the period (round) in overall. However, there are noticeable different patterns in high stake games. The observation that cooperation rates are declining over the period is consistent with the findings of many experiments examining cooperation in one- shot and finitely repeated Prisoner's dilemma games such as Dawes (1980), Roth (1988), Andreoni (1988), Cooper et al. (1996), and Clark and Sefton (2001).

Figure 3.1 displays the patterns of frequency of cooperative choices in high stake games. The striking result is that cooperation behaviors are completely different in sessions (High stake 1 and High stake 2 sessions) where payoffs are exactly the same. Unfortunately, we cannot directly explain the behavioral differences between same games for now and ongoing re-research will oversee these unpredicted results.

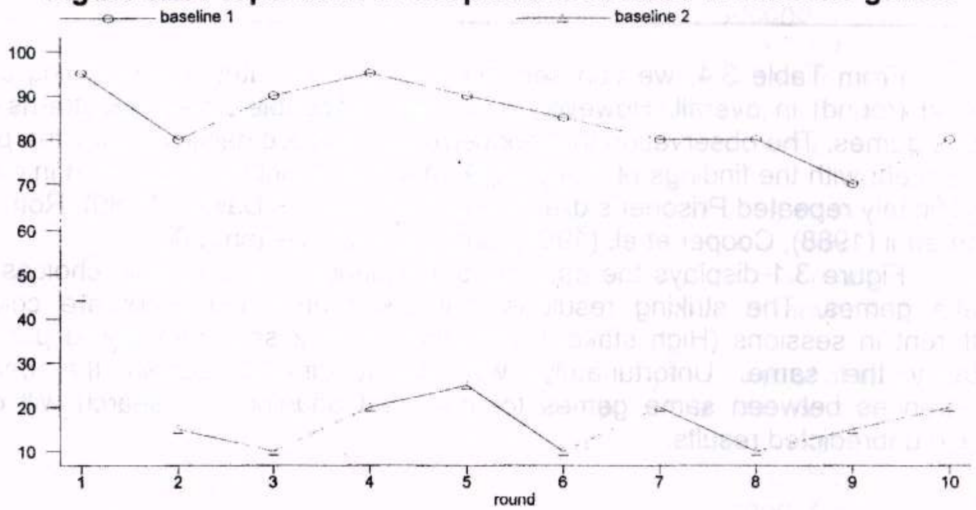
Figure 3.1. Proportions of cooperative choices in High stake games.



In Baseline I game, Figure 3.2, cooperation proportions are much greater than in Baseline 2 game. Regardless of the difference between cooperation proportions, the tendencies in cooperation rates are quite similar. Initially, the cooperative proportions decline and then gradually increase from the second or third rounds.

Afterwards, the cooperative proportions fall again and at the end, they increase slightly in the final rounds. The trends of cooperation rates in 2 games are also similar and decline over rounds.

Figure 3.2. Proportions of cooperative choices in Baseline games



. We, furthermore, estimated the proportions of cooperative choices of first and second movers. The results, we show in Table 3.5, also support common experimental evidence that the proportions of cooperative choices decline over rounds. The proportion of cooperative choices by first movers in each around is

higher than that of second movers. This result is similar to the result of Clark and Sefton (2001) experiment. They explained why cooperation declines over round as follows. Initially, some first movers expect higher level of reciprocation and cooperate. But, less than half of the second movers reciprocate in their experiment (just more than half of the second movers reciprocate in our experiment), and hence first movers adjust their beliefs so that the proportion of cooperative choices declines. A second mover has no problem predicting a first mover's play since a second mover makes decision after a first mover so that he already knows what choice a first mover has made, and cannot also influence the play of future opponents.

Table.3.5. Proportions of cooperative choices by first and second movers

	Round 1	Round 10
First mover		
Total	62.50	45
High stake I	30	20
High Stake II	60	40
Baseline I	100	100
Baseline II	60	20
Second mover		
Total	40	22.50
High stake I	10	10
High stake II	30	100
Baseline I	90	60
Baseline II	30	20

However, second movers preferred to cooperate in the latter half of round in High stake II game while first movers chose to defect in this game.

Table.3.6. Proportions of cooperative choices by second movers (Conditional on First mover choice)

	Round 1	Round 10
Following defect		
Total	22.50	15.38
High stake I	12.50	5.88
High stake II	27.27	25
Baseline I	100.00	100.00
Baseline II	25.00	0
Following cooperate		
Total	80.00	67.86
High stake I	50.00	66.67
High stake II	66.67	0
Baseline I	94.97	76.47
Baseline II	75.00	100.00

Table 3.7. Frequencies of action combinations

	High stake I	High stake II	Baseline I	Baseline II	All sessions
(C, D)	18	18	18	14	68
(C, C)	48	8	151	24	231
(D, C)	18	19	17	14	68
(D, D)	116	155	14	148	432
Total	200	200	200	200	800

Comparing to the results in the Clark and Sefton (2001) experiment, the subjects, in Mongolian experiment, are more likely to cooperate in the Prisoner's Dilemma than the subjects in the UK and USA. While the proportions of the cooperative choices in the first round by first mover and second mover are correspondingly 42.5% and 23.3% in the UK and USA experiments, the proportions in the Mongolian experiments are 62.5% and 40% respectively. Similarly, the proportions are larger in the Mongolian experiments than the UK and USA experiments in the final rounds as well.

Table 3.6 indicates that the second movers are more likely cooperate in response of the first movers' cooperative choices than their defect choices. This evidence, consistent with the evidence of Clark and Sefton (2001), suggests that cooperation is motivated by reciprocation, rather than pure altruism.

Table 3.7 describes the observed frequencies of action combinations. A strong finding here is that the first mover's cooperating and the second mover's defecting (C, D) outcomes, 14-18 of 200 games played in each session, are almost indistinguishable in all sessions. Selfish subjects would respond to cooperation with defection and we can argue that selfish behaviors in sessions are similar. Moreover, the first mover's defecting and the second mover's cooperating (D, C) outcomes, 14-19 of 200 games played in each session, are also very similar in sessions. The frequency of outcomes featured cooperation in response to defection was just 3% of all games in Clark and Sefton (2001). It is lower than 8.5% that we have found in our experiments. In (D, C) outcome, the second mover receives zero and the first mover gains the temptation payoff. In high stake games, for example, the second mover who choose to cooperate in response to defection gives the first mover 5000 points at a cost of 1000 points. Clark and Sefton (2001) argue that, in this case, such subjects probably made mistakes, were irrational, or more interestingly, acted altruistically.

The Nash equilibrium outcome, (D, D)- mutual defection, is the most frequent outcome- accounting for 54% of all games. However, the proportion of (D, D) outcomes in our experiment is 14% lower than the proportion of (D, D) outcome (68%) in the Clark and Sefton (2001) experiment.

The cooperative choice is the second most frequent outcome (29%) in our experiment. However, most of cooperative choices (67 % of cooperative choices) were made in Baseline 1 Session. The number of cooperative choices made in High stake game I (48) is significantly much greater than that in High stake game II (8). We cannot directly conclude whether high stake affects second movers' tendency to cooperate in response to first movers' cooperation because the comparison of cooperative choices made in high stake games and baseline games is very complicated. Even discarding unusual Baseline I game, we found contrasting results that cooperative choices, on the one hand, in High stake I game (48) were twice greater than those in Baseline II (24) and, on the other hand, cooperative choices in High stake II game (8) were 3 times less than those in Baseline II game. In Clark and Sefton (2001), the effect of double stakes on tendency to cooperate in response to first movers' cooperation was also not that clear.

3.2.2 Probit Models and Estimation

We transformed the data of second movers' choices, first movers' choices, and first movers' choices in the High stake games into binary data where the dependent variable (*y*- second movers cooperative choice) took the value 1 if the second mover cooperated and 0 otherwise and the explanatory variables *oc* and *ochs* took the value 1 and 1 if the first mover cooperated in all sessions and the first mover cooperated only in High stake sessions respectively and both zero otherwise. We also generated *hs* dummy variable that took the value 1 if the session was High stake game and took 0 if the session was Baseline game. Adding round (*rd*) as another explanatory variable, we built binary response probit model investigating the effect of first mover choice, high stake, first mover choice in high stake, and round on the second mover cooperation as:

$$P(y=1 / \mathbf{x})=G(\beta_0 + \beta_1 oc + \beta_2 hs + \beta_3 ochs + \beta_4 rd)$$

where ***x*** denotes the matrix of explanatory variables (*oc*, *hs*, *ochs*, and *rd*) and G is a function taking on values strictly between zero and one:

$0 < G(z) < 1$, for all real numbers z and the predicted probabilities are given by the cumulative standard normal density distribution function, which is

$$G(z) = \Phi(z) = \int_{-\infty}^{z} \phi(v)dv$$

Probit model relies upon the standard normal distribution $\phi(v)$:

$$\phi(v) = (2\pi)^{-1/2} \exp(-z^2/2)$$

The probit model constrains the estimated probabilities to be between 0 and 1, and relaxes the constraint that the effect of independent variables is constant across predicted values of the dependent variable. The probit model also assumes that while we only observe the values of 0 and 1 for the dependent variable-y, there is a latent, unobserved continuous variable y* that determines the value of y. Using maximum likelihood method we can compute estimates of the coefficients (β-s in our model) and their corresponding standard errors that are asymptotically efficient. It is, however, worth noting that these estimates cannot be interpreted in the same manner that normal regression coefficients are. The coefficients give the impact of the independent variables on the latent variable y*, not dependent variable –y itself.

We estimated two different probit models, namely, Model 1, in which we used all data from all sessions, 400 observations, and Model 2, in which we discarded the data of Baseline game 1 and used 300 observations for the maximum likelihood estimation. We consider that the session 3- Baseline game 1 may be biased since an extremely high level of cooperative choice was made in this session. We cannot be certain why so many positive reciprocal choices were made unexpectedly in this session. However, we believe there may be the possibility that the subjects may have communicated with subjects from previous sessions and committed themselves to cooperative strategies in that session. Due to this reason, we estimated a probit model without Baseline game 1.

We, furthermore, estimated two random effects probit models. Such models have recently become very popular in econometric analysis. The random effects model imposes the restriction that the correlation between error terms for the same individual is a constant and thus is known in the literature as the 'equi-correlation model'. Consider the error term $v_{it}=\alpha_i+u_{it}$ where α_i is an individual specific component, which is so-called an unobserved effect. In the random effects model, we assume that u_{it} (error term) – IN(0, σ_u^2). The random effect probit model is estimated by maximum marginal likelihood method. In order to marginalise the likelihood we assume that, conditional on the independent variables, the individual specific components are IN(0, σ_α^2) and are independent of the u_{it}'s and the independent variables. This implies that the correlation between two error terms for the same individual is a constant given by,

$$\rho = corr(\upsilon_{it},\upsilon_{is}) = \frac{\sigma_a^2}{\sigma_a^2+\sigma_u^2}, t \neq s$$

Then we can write our model of interest as,

$$P(y=1 / \square_i, \mathbf{x}_i)=P\left(\frac{u_{it}}{\sigma_u} > \frac{-x_{it}'\beta - \alpha_i}{\sigma_u}\right) = \Phi(z_{it})$$

where $x_{it}'\beta = \beta_0 + \beta_1 oc + \beta_2 hs + \beta_3 ochs + \beta_4 rd$, $z_{it} = -(x_{it}'\beta + \alpha_i)/\sigma_u$, and $\Phi(z_{it})$ is the standard normal distribution,

$$\phi(v) = (2\pi)^{-1/2}\exp(-z^2/2)$$

In random effect probit models, an individual's propensity to cooperate comprises a deterministic term, reflecting the effects of the explanatory variables, and a random error that includes unobserved random effect-an individual specific component. Given these assumptions, some subjects would be more likely act cooperatively than others even after controlling for the explanatory variables, and hence, for a given subject the error terms can be correlated across rounds. Model 3 and 4 are the random effect probit models and we used all sessions' data for Model 3. But in Model 4, we didn't include Baseline 1 game data. Table 3.6 (next page) presents the results of the probit models estimated by the maximum likelihood method.

Checking the results in Table 3.8, we can see that the signs of coefficients are identical across the models, while statistical significance of the explanatory variables is also comparable. Using the estimates, the statistical significances of the estimates and hypotheses tests, we summarise the results as following.

1. In all 4 models, the opponent (the first mover) choice has significantly positive effect (p=0.000 in all four models) on the probability of the second mover cooperation. This result confirms Clark and Sefton (2001)' s finding that shows the first mover's choice is the most important variable influencing cooperation. Hence, we support the argument that cooperative behaviour reflects fairness concerns rather than pure altruism.

Table 3.8. Probit results

Variable	Model 1	Model 2	Model 3	Model 4
Constant	-1.858	-2.230	-1.694	-2.389
	(0.314)	(0.399)	(0.406)	(0.472)
Opponent's choice (oc)	2.512	2.031	2.376	2.175
	(0.289)	(0.409)	(0.360)	(0.448)
Highstake (hs)	-0.216	-0.0598	-0.676	-0.121
	(0.351)	(0.387)	(0.512)	(0.479)
Opponent's choice in high stake games (ochs)	-0.587	-0.076	-0.149	-0.047
	(0.406)	(0.495)	(0.516)	(0.542)
Round (rd)	0.009	0.045	-0.014	0.042
	(0.030)	(0.039)	(0.034)	(0.041)
P			0.364	0.217
			(0.114)	(0.136)
N	400	300	400	300
Log-likelihood	-133.555	-81.734	-125.164	-79.84
Pseudo R^2	0.457	0.355		
Prob > χ^2	0.000	0.000	0.000	0.000
LR (4) χ^2	224.92	90.16		
Wald χ^2 (4)			89.87	56.22

Notes to Table 3.6

1. N denotes the number of observations that we used in our estimation
2. ρ- is the correlation coefficient of composite error term = $Corr(v_{it}, v_{is})$

$$\rho = \frac{\sigma_a^2}{\sigma_a^2+\sigma_u^2}, t \neq s$$

where σ_a^2 is the variance of random effect and σ_u^2 is the variance of the noise term.
3. Pseudo R^2 is a goodness of fit measure defined as

$$pseudoR^2 = 1 - \frac{1}{1+2(\log L_1 - \log L_0)/N},$$

where L_0 is the log-likelihood value for the unrestricted model and L_1 is the log-likelihood value for the restricted (final iteration's) model.
4. Model □² – Likelihood ratio (LR) test evaluates the null hypothesis that all coefficients in the model equal zero.
χ^2=-2(Ln L_1-LnL_0)
where L_0 is the log-likelihood value for the unrestricted model and is the log-L_1 likelihood value for the restricted (final iteration's) model or model of our interest.
5. Estimated standard errors in parentheses.

2. The high stake has negatively related to the second mover cooperation in all four models. But the effect is not significant at all. p value of high stake was at least 0.187 in the third model at most 0.877 in Model 2. This result also confirms the results of Clark and Sefton (2001). In their models, doubling the stake has an insignificant effect (p=0.396). Our result is also consistent with the results of experiments in ultimatum game such as Cameron (1995), which detected no change in behaviour even in a presence of a change in stakes by a factor of 40.

3. The hypothesis that cooperative choices made by second mover decline over rounds was rejected in our models. The round variable has an insignificant effect on the second mover cooperation. However, the insignificant relationship is positive in all models except Model 3. In contrast, Clark and Sefton (2001) found the round variable is a significant negative effect on the second mover cooperative choice. According to our prediction of a second mover's probability of cooperation, interestingly, the tendency for a second mover cooperation in high stake and baseline games increases slowly in later rounds.

4. In all four models, an opponent's choice in high stake games has an insignificant effect on the second mover cooperation. Oddly, it has negatively related to the second mover cooperation while the opponent's choice in all games has positive effect on the second mover cooperation. However, the estimates of probit models cannot be interpreted same as normal regression coefficients. Although, the hypothesis that an opponent's choice in high stake games has an effect on the second mover cooperation is rejected at a significance level of 10%, it has the second lowest p values in some models at least 0.149 in Model 1 and at most 0.930 in Model 4.

Hypotheses tests:

The Wald and Likelihood Ratio (LR) tests are similar ways of testing the significance of particular explanatory variables in a statistical model. If the Wald test (or LM) is significant, we can conclude that the parameters associated with explanatory variables are not zero, so that the variables should be included in the model. If the Wald test (or LM) is not significant then these explanatory variables can be omitted from the model.

The null hypotheses that all coefficients in Model 1 and Model 2 equal zero are rejected in Model 1 and Model 2. Because likelihood ratios (LR (4) χ^2) in Model 1 and Model 2, 224.92 and 90.16, are both greater than the critical values of the □^{2} Distribution, at the significance levels of 0.10, 0.05 and 0.01, 7.78, 9.49, and 13.28 with degree of freedom 4.

With 4 restrictions, the Wald statistic is asymptotically distributed to χ^2 (4) under the null hypothesis. The null hypotheses (the parameters associated with the explanatory variables are zero) are rejected in both Model 3 and Model 4. The Wald statistics 89.87 and 56.22, in Model 3 and Model 4 respectively, are also both greater than the critical values of the χ^2 Distribution, at the significance levels of 0.10, 0.05

and 0.01, 7.78, 9.49, and 13.28 with degree of freedom 4. Therefore, we conclude that the parameters associated with the explanatory variables in all 4 models are not zero, so that the variables should be included in the models.

We also tested a goodness of fit of the models by matching the actual and the predicted values of the Models. If the probability of second mover cooperative choice equal or greater than 0.5, we suppose that the predicted and actual values are matched. Using this restriction, we found that the predicted values in Model 1 and 2 matched 84.5% and 85.66% respectively while the predicted values in Model 3 and 4 matched correspondingly 84.5% and 85.33% of actual values. However, the accuracy difference is slight we consider that the estimation without Baseline Game 1 data is more appropriate than with Baseline game 1 data.

Conclusion

The main aim of the paper is to evaluate competing argument- the effect of high stake on fairness concerns. To do so, we design experiments to check fairness considerations in the environments of baseline games and high stake games where the payoffs are increased by a factor of ten. Four different statistical models, two simple probit and two random effect probit, are estimated and tested. The results of our experiments are mostly consistent with the existing evidence on the importance of fairness considerations.

We find that first mover's choice for cooperation is the most significant factor for second mover cooperation. This result, which is consistent with the result of the Clark and Sefton (2001) experiment, suggests that cooperative behaviour of people reflects fairness considerations rather than unconditional altruism. Our finding supports the theoretical approach, developed by Fehr and Gachter (1998), and Bolton and Ockenfels (2001), which focuses on the reciprocation rather than altruism or egoism. In all 4 models, only the opponent's choice is highly significant and other explanatory variables (opponent's choice in the high stake games, high stake, and round) are not significant to explain the reciprocation. Especially, our interest of investigation, high stake is highly insignificant and has no effect on the second mover's cooperative choice. This finding contradicts with the Rabin's (1993) Fairness Model. According to Rabin's (1993) model, for sufficiently high stakes, the material component dominates the utility function and thus the impact of fairness on the players' strategies diminishes. In our experiments, when the stakes are increased by a factor of 10, the subjects still make positive reciprocation choices. Therefore, in a presence of high stake, fairness is still considered. Our result is consistent with the Nelson' s (2001) augmented utility function. He suggests a more general form of utility function. According to him, there might be either any kind of or no relationship between the material-based utility and the utility derived from fairness concerns. Our evidence is also consistent with the results of many experiments, aimed to check the effect of high stakes on fairness considerations, in an ultimatum, a dictator, and a gift exchange games such as Slonim and Roth (1998), Cameron (1995), Nelson (2002), and Fehr, Fischbacher and Tougareva (2002). We observe that the second movers are less likely to cooperate after the cooperative choices of first players in high stake games. Contrastingly, Clark and Sefton (2001) find no effect from doubling the stakes.

We note that a Nash equilibrium outcome was the most frequent observation. However, a significantly high level of cooperative choices was made by the subjects in our experiment. Consistent with the extensive literature in the Prisoner's Dilemma Game, we find that cooperation rates decline with repetition. Even the second movers' cooperation rates, which are conditional on the first mover's cooperation, fall over the rounds. It is also worth noting that there has been a very slight rise in the rates of cooperation in the final rounds.

The results show that Mongolian subjects are more likely to cooperate than the subjects of the experiments in the UK and USA by Clark and Sefton. As we mentioned earlier, there might be institutional factors left over from the communism in Mongolian subjects. We consider it as an option of the further research.

Finally, a strong finding in our experiments is that cooperation behaviors are completely different in the sessions (High stake 1 and High stake 2 sessions) where payoffs are exactly the same. The finding suggests that even in the student populations there can be a degree of behavioral variability among samples. The question, raised by our experiment, is why the subjects behave so differently. Another option of further research is, therefore, definitely the investigation of this question.

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Хожилын хэмжээ шударга байдалд нөлөөлөх нь: Монголын туршилт

Л.Эсмэдэх

Эдийн засгийн онол нь судалгааны аргын хувьд шинжлэх ухааны маш өндөр түвшинд хүрч байгаагийн нэгэн илрэл нь туршилтын эдийн засгийн онол юм. Макро болон микро эдийн засгийн үндсэн асуудлуудыг судлахдаа агентуудын үйл хөдлөлийг тодорхойлох туршилт явуулан, үр дүн, үйл хөдлөлийг нь орчин үеийн эконометрик аргуудын тусламжтайгаар шинжлэн онолын дүгнэлтийг баталж эсвэл няцаадаг эдийн засгийн онолын нэг салбарыг туршилтын эдийн засгийн онол гэж товч тодорхойлж болно.

Эдийн засгийн онолын тулгуур үндсэн нөхцлүүдийн нэг нь хувийн сонирхол болон рациональ байдал билээ. Аливаа агентуудын үйл хөдлөл ашгийн төлөө байдаг гэж эдийн засгийн онолд үздэг. Гэтэл сүүлийн үеийн эдийн засгийн онолд хийж буй туршилтуудын үр дүнгээс харахад агентуудын үйл хөдлөл болгон ашгийн төлөө байдаггүйг илтгэж эдийн засгийн онолын тулгуур болсон нөхцөл (assumption) ганхаж эхэллээ. Агентууд ашгийн төлөө бус харин шударга байдлын төлөө шийдвэр гаргаж болно гэдгийг тоглоомын онол болон эдийн засгийн онолын туршилтуудын үр дүн харуулж байна. Харин шударга байдалд өндөр мөрий буюу хожил их байх нь хэрхэн нөлөөлөх вэ? гэсэн асуудлыг эдийн засагчид тэр болгон судалж үзээгүй байна. Энэ асуудлыг тоглоомын онолын үндсэн арга болох шоронгийн зарчимыг ашиглан Монголд хийсэн туршилт дээр үндэслэн эконометрикийн энгийн профит болон санамсаргүй нөлөөлөлтэй профит 4 загвараар шинжлэн судалсан юм. Шинжилгээний үр дүнгээс харахад хамтарсан буюу бие биенийхээ төлөө гаргасан шийдвэр нь шударга байдлаас голлон хамаарч байна. Түүнчлэн тоглолтоос олох ашгийг буюу хожлыг 10 дахин ихэсгэх үед буюу өндөр мөрийний хувьд хувиа хичээзэгүй буюу шудрага байх сонголтууд хийгдсэн бөгөөд шударга байдалд хожил өндөр байх буюу өндөр мөрий нөлөөлөхгүй байна гэсэн дүгнэлтэнд хүрсэн юм. Энэ нь ч бусад орнуудын судлаачдын өөр аргууд хэрэглэж гаргасан үр дүнгүүдтэй нийцэж байгаа билээ. Мөн Монголын туршилтанд оролцогсод Англи, АНУ зэрэг орнуудын оролцогсдоос илүү хамтарсан шийдвэр гаргадаг буюу шудрага байгаа нь ажиглагдав. Туршилтанд оролцогсдын үйл хөдлөлд ялгаатай байдал ажиглагдсан бөгөөд үүнийг цаашид хийх судалгааны ажлуудаараа шинжлэх юм.