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Using Ultimatum Game to Assess the Role of Financial Incentives in Implicit Deception

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Resumo

The objective of this paper is to examine bargaining and the use of deception when it raises the probability of financial gain using the ultimatum game experiment. The proposer has more information and can use it to misrepresent the initial amount, implicitly or explicitly, and try to appear fair with the split offered. However, using implicit deception is not always beneficial to the proposer. Our results show that higher financial incentives led to less expropriative offers and communication resulted in fairer offers.

Palavras-chaves

Ultimatum Game, Deception, Communication, Subgame Perfect Equilibrium, Experimental Economics

1. INTRODUÇÃO

A good way to explore the role of communication and money in an economic context is through bargaining. The ultimatum bargaining game features a situation in which one player defines all aspects of an agreement, and the other player can either accept it or reject it (Güth and Kocher, 2013). There is asymmetric information, thus players can deceive. Thus, the game can be used to understand both how communication may make players fairer and how financial incentives can lead to deception.

The standard ultimatum game (Guth et al., 1982) involves two players, the first player (proposer) receives an initial endowment and chooses how to split it with the second player (receiver). The receiver can accept or reject the offer; acceptance leads to the split proposed, while rejection leaves both players with a zero payoff. Studies have found that players were less likely to lie when there is explicit communication (eg. Brunner and Ostermaier, 2018), promises (eg. Kriss, et al., 2013), or requests from proposers (eg. Rankin, 2003). This could be explained by the psychological cost of lying and players' sense of fairness.

As it is common knowledge, actions are information-revealing, and people can communicate through them; this defines implicit communication (Brunner and Ostermaier, 2018). In the ultimatum game with incomplete information, proposers can pretend to be fair and induce the receiver to infer the initial amount wrongly; therefore, deception is possible. Due to the importance of the sense of fairness, subjects try to behave in a way such that others cannot be sure that they are greedy (Guth et al., 1996). In this proposed study we will be able to analyze if implicit deception is effective and how beneficial the asymmetric information is for the proposer.

In the experiment, we adopted the ultimatum game with incomplete information to understand the role of financial incentives as a potential determinant of the decision-making process regarding the use of deception. In both treatments, the receiver was not aware of the initial amount shared, only of the probabilities for each of the three values. So, in the no message treatment, implicit deception was possible, and in the communication, the treatment proposer could explicitly deceive the receiver. The first player received one of the three distinct amounts possible and decided how to allocate it between him and player 2. The second player could either accept or reject the offer, rejection causing both of the players to end up with no payoff. Hence, a post-game questionnaire verified proposers' beliefs regarding the receiver's beliefs about the total amount offered.

We anticipate that the size of financial incentives will be relevant to the decision regarding the manipulation of the other players' beliefs. We expect people to leave extreme positions of fair or selfish behavior when financial incentives increase, replacing both with a slight form of deception. It is also expected that fair offers won't be more likely to get accepted, meaning that asymmetric information is beneficial and deception is effective.

2. Theory

The ultimatum is a sequential two-players game. Initially, the first player, called proposer, decides how to split a given amount between him and the next person. Then, the second player can either accept or reject it. If the responder agrees, the initial amount is shared as suggested by the proposer, if he rejects, both players leave with zero payoffs. More formally, the proposer suggests splitting the initial amount keeping x, and giving y to the receiver, where x, y ≥ 0. Then the receiver can accept it $\delta(x,y)=1$, or reject it $\delta(x,y)=0$. And the payoff for the proposer is $\delta(x,y)x$, and for the receiver is $\delta(x,y)y$.

In this game, the receiver can either be aware of the initial amount or only have the information about his share of the endowment. In both cases, the Nash Equilibrium predicted is the same. This equilibrium assumes that each player is choosing the strategy that results in a bigger payoff for them. So the perfect Nash equilibrium in the ultimatum game is for the first player to make the lowest offer possible and the second player to accept any offer bigger than zero. However, experimental evidence indicates that, on average, the split proposed is around 40-50%, such offers are usually accepted (Güth and Kocher, 2013). Also, humans do not act as money maximizers all the time, even though it is more beneficial to get a low payoff than none, when the split suggested is unfair, the receiver is more likely to reject it (Güth and Kocher, 2013). Responders do not only care about their monetary gain but the fairness perceived comparing their payoff with proposers'.

3. Experimental Methods

In this study, we had two groups. The interest group played the ultimatum game with incomplete information. In this group, only proposers knew the initial amount, and receivers were only aware of the distribution of probabilities of the values in the game. In the control, group receivers were aware of the initial endowment. The distribution of probabilities of the values was: 10$ with 50% probability, 20$ and 30$ with 25% probability each.

In the incomplete information scenario, deception was allowed. To investigate if the deception was intentional and effective, a post-game questionnaire asked receivers about their beliefs and proposers about what they thought were receivers' beliefs. Age, gender, income was also collected.

Data and Sample

The experiment involved 500 undergraduate students from Brazil divided between two treatments and three initial endowments. In the communication treatment, the proposer sent a message to the other player informing the amount received ($10,$20, $30), whether it was true or not. In the no communication treatment, communication was not allowed.

In the communication treatment, there were 69 proposers with $10, 40 proposers with $20, and 39 proposers with 30$, and the same number of responders in each treatment. In the no communication treatment 79 proposers with $10, 41 proposer with $20 and 41 proposers with $30, and the same number of receivers.

Hypotheses Development

Based on the traditional economic theoretical background, we expected that increasing financial incentives, participants will be more likely to maximize their payoffs by manipulating the other player's beliefs using strategic offers. In this perspective, implicit deception would be independent of the financial incentive. In our game framework, we observed fully expropriation offers when the proposer receives $20 or $30 and decides to offer only $5 to the other player. We have also tried to observe if the individual payoff would be greater for those who decided to manipulate the respondent´s beliefs making their offer appear fairer than it really was. Besides, we wanted to analyze the potential of asymmetric information to provide higher outcomes to the better-informed player, offering empirical evidence of the relation between deception and asymmetric information as well as empirical evidence of the rewards due to the use of implicit deception. We proposed three hypotheses.

Hypothesis 1*. The higher the financial incentive in the game, the higher the propensity to adopt fully expropriation offers under asymmetric information.*

Hypothesis 2. *Manipulation of respondent´s beliefs is an effective strategy to increase proposer´s payoffs.*

Hypothesis 3. *Asymmetric information increases the payoff of the better-informed player*

We tested a few regression models to understand if our hypothesis were right. The first model used a probit regression with *fair* as the dependent variable and two amount dummys (*amount 20 and amount 30*) as the independent variables to understand how the initial amount would impact the fairness of the proposer. The second model was also a probit regression with fair as the dependent variable, but using *communication treatment* as the independent variable. In the third model, we used an OLS (ordinary least square) regression with *sent perc* as the dependent variable and fair as the independent. Both models were used to analyze the behavior of the proposer with or without communication. The fourth and fifth models were probit regressions using acceptance as the dependent variable, one with the *fair* variable and the other with *offers 5* as the independent variable. This analyzed if fully expropriative offers were effective. All the models had gender interactions.

4. Results

To understand if higher financial incentives lead to deception in the no communication treatment and if proposers benefit from information asymmetry, we used five models. In the first and second we used *fair*, a dummy that receives 1 when the offer is equal to or bigger than 50% of the initial amount, as the dependent variable. In the third and fourth, the dependent variable was an *acceptance* dummy, which receives 1 when the responder accepts the proposer's offer. In the fifth model, the dependent variable was *sentperc*, representing the percentage of the initial amount offered by the proposer.

What makes the proposer fairer?

In the no communication treatment, proposers are less likely to make fair offers when they received a bigger initial amount. However, fully expropriative offers were more frequent when the initial amount was R$20 than R$30. So, proposers were more likely to take advantage of the asymmetric information, implicitly suggesting to the receiver that the initial amount was lower, making their offer seems fair when the initial amount was $20. Also, men are more likely to make fair offers when they receive $20 or $30, but is less likely when the initial amount is $10.

Furthermore, the use of communication also impacts the fairness of the first player. They are more likely to make fair offers when there is communication. So, the implicit deception makes it easier for the proposer to take advantage of the communication asymmetry.

Do proposers benefit from deception?

Even with no communication, players are more likely to accept the offer when it's actually fair and usually rejects offers equals to $5, which represents half of the lower amount possible. However, men are less inclined to reject offers when they seem unfair or is equal to five than woman. Therefore, even with asymmetric information, most of the time proposers did not benefit from deception and, making low offers leads receivers to reject it, leaving both of them with $0.

5. Conclusion

This paper studies whether financial incentives and communication affect how players benefited from asymmetric information behave. From a standard game theory angle, proposers' ability to deceive receivers is equivalent in the communication or no communication treatment (Kriss, et al., 2013). However, we found that communication leads proposers to fair offers, which can be caused by the psychological cost of lying. It is harder to be dishonest when you are explicitly lying.

Furthermore, deception wasn't an effective strategy to increase proposers' payoffs, and players were more inclined to reject not fair offers, even when they did not know the initial amount, leaving both players with $0. This is also counter-intuitive since receivers are not maximizing their payoff in order to "send a message" that they do not approve dishonesty.

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7. Tables

Table 1: Variable List

variable	description
amount 20	a dummy equals 1 when the initial amount is $20
amount 30	a dummy equals 1 when the initial amount is $30
gender of the sender	a dummy equals 1 when the sender (first player) is a man
gender of the receiver	a dummy equals 1 when the receiver (second player) is a man
communication treatment	a dummy equals 1 when there is communication between players
fair	a dummy equals 1 when the offer is 50% of the initial amount
offers 5	a dummy equals 1 when the offer made was R$5

Table 2: Descriptive Statistics

	Initial amount				
	R$10	R$20	R$30	Fair	Acceptance
Mean	R$ 4,13	R$ 6,76	R$ 10,07	0,373	0,839
Mode	5	5	10	0	1
Maximum	7	10	15	1	1
Minimum	0	2	5	0	0

Table 3: Regression Models

	Dependent variable:				
	fair		sentperc	acceptance	
	probit		OLS	probit	
	(1)	(2)	(3)	(4)	(5)
amount 20	-0.773**				
	(0.348)				
gender of the sender	-0.224				
	(0.283)				
amount 30	-1.257***				
	(0.389)				
gender and 20 amount interaction	0.583				
	(0.499)				
gender and 30 amount interection	0.584				
	(0.546)				
communication treatment		0.460***	7.360***		
		(0.149)	(1.835)		
fair				0.538	
				(0.410)	
gender of the receiver				0.030	
				(0.294)	
fair gender interection				-0.568	
				(0.529)	
offers equal to five					-0.642
					(0.586)
gender of the receiver					-0.194
					(0.641)
offers 5 and gender interection					4.724
					(472.925)
Constant	0.132	-0.325***	36.781***	0.908***	1.863***
	(0.204)	(0.101)	(1.270)	(0.197)	(0.437)
Observations	161	291	309	161	82
R2			0.050		
Adjusted R2			0.047		
Log Likelihood	-98.108	-195.672		-70.107	-14.749
Akaike Inf. Crit.	208.216	395.344		148.215	37.498
Residual Std. Error			16.116 (df = 307)		
F Statistic			16.084*** (df = 1; 307)		

Note: *p<0.1; **p<0.05; ***p<0.01