DIRECT REVELATION UNDER LYING AVERSION

An Undergraduate Research Scholars Thesis

by

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TABLE OF CONTENTS

ABSTRACT

Direct Revelation under Lying Aversion

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Recent research has shown people are lying averse; it is as if they suffer monetary costs from not telling the truth. By using a game proposed by Repullo (1985) we study the differential effect of lying aversion and direct pecuniary incentives in the operation of an economic institution. We design an economics experiment that implements this game in a laboratory environment. It is predicted that there will be both evidence of lying aversion and response to direct incentives. We detail how empirical results would allow us to discriminate what is the role, or relative importance, of these two effects.

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KEY WORDS

Lying Aversion; Revelation Principle; Mechanism Design

SECTION I

INTRODUCTION

In 1985, Economist Rafael Repullo outlined a social choice rule with a direct and indirect mechanism. In the original model, the first mechanism included a third strategy option which was weakly dominated. When moving from a three by three game to a two by two game with no weakly dominated strategy, both strategies could be dominate depending on the type of the player. Having two dominate strategies in a direct mechanism, with one being dishonest, makes the prediction of the honest dominate strategy being played hard. Our goal is to incorporate lying aversion techniques into an experiment to help mitigate this issue explained by Repullo.

In recent years, lying aversion has been studied and incorporated more in behavioral economics such as the mega analysis by (Abeler et al a2019). These recent studies have shed light on how robust lying aversion is in incentivized economic strategic situations. Research show that people have an adverse reaction to lying and dishonesty even when it may increase their utility or payoffs. Being seen or perceived as dishonest holds negative emotional utility that outweighs the possible financial benefit that may come from such acts.

We comprised an experiment that follows Repullo's original game. It is designed that subjects have the opportunity to reveal private information about themselves truthfully or non-truthfully and in some cases, decline to reveal. (Sobel 2020) describes definitions that could match the three strategy options in our experiment defined in the original mechanism. The definition of lying, honesty, deception and damage are discussed in detail. Such definitions are used to represent different strategy options each player has in our experiment. Concepts from (Gneezy et al 2018) on lying aversion techniques are used closely in our model. They discuss the

intrinsic value of social identity, or how one is perceived by others. Their experiment examines how the possibility of being caught in a lie is enough to discourage dishonest behavior. We use this principle by adding financial consequences to a third party.

This paper and experiment only discus mechanisms under incomplete information. It is intended that by lowering the payoff of the third party when one or both subjects in the model are dishonest, the direct mechanism will implement optimal states in Bayseian strategies (incomplete information). We predict that in addition to the lying aversion techniques, direct incentives will also help predict truthful behavior.

The remainder of the paper is organized into sections. Section II will be the setup of the experiment and model. Section III will show predictions of the different treatments. Finally, Section IV will be a conclusion and wrap up of findings.

SECTION II

EXPERIMENTAL DESIGN

The experiment consists of subjects being assigned a type and reporting their type to a third party. The third subject was included in each group as a way to make each lie by subjects harmful to another party (i.e., not "white lies", see Sobel 2020). If the subjects played the game dishonestly, the third party's payoffs would be reduced.

The Game

A concise explanation of the framework used in the set-up of the experiment follows below. For the two workers in each group, they can either be an expert type, E, or a beginner type, B. Each type can do either easy work, e, or hard work, h. If both players report as the same type, they both do half easy and half hard work. If the players report different types, the beginner does the easy work and the expert does the hard work. Therefore, there are three different combinations that the workers can be in. The first is where both workers are experts, the second is where both are beginners, third is a combination of the two types. The payoff for each worker type is shown in table 1 for players that are both experts. Table 2 is the payoff for players that are both beginners.

Table 1. 2x2 Expert Type Payoff

Expert Type	e	h
e	2,2	4,2
h	2,4	4,4

Table 2. 2x2 Beginner Type Payoff

Beginner Type	e	h
e	1,1	0,2
h	2,0	4,4

Table 3 and 4 show the payoff when a third option, declining to report, d, is introduced for each worker type.

Table 3. 3x3 Expert Type Payoff

Expert Type	e	h	d
e	2,2	4,2	4,2
h	2,4	4,4	2,4
d	2,4	4,2	2,2

Table 4. 3x3 Beginner Type Payoff

Beginner Type	e	h	d
e	1,1	0,2	0,2
h	2,0	4,4	2,0
d	2,0	0,2	1,1

Design

The experiment follows a 2x2 design, two treatments are direct mechanisms and two indirect mechanisms. For each mechanism type, one treatment is a 3x3 normal form game that consists of the weakly dominated strategies, representing Repullo's original mechanism that implemented the social choice rule. The other treatment is a 2x2 normal form game that will not include the weakly dominated strategies.

In each treatment subjects are randomly assigned into groups of 3. In each group two subjects played the role of independent contractor workers, while the third subject was the staffer at a firm who assigned jobs to the workers. For our experimental design each worker is either a beginner or an expert type with different dominant strategies and an even possibility of being each type. Each worker only knows their own type and not that of the other. The subjects are shown their type and what they are paid if they report each type. They are also shown what the other worker is paid for each option, and what the staffer is paid depending on each worker's decision. For the indirect treatments, each worker selects a payment option that coincides with the worker types. To differentiate, in the direct mechanism treatments the workers report specifically a type to the staffer. To make the lying most explicit, subjects are required to type in their type in the direct revelation treatments. They can either report as an expert or beginner, and in two of the treatments, they can decline to report. For each worker that is not truthful, the staffer's pay is lessened. The staffer is paid at the end of each round once both workers report a type. The staffer is paid a base pay of 8 dollars which decreases by 3 if one player is dishonest and 7 if both are dishonest. It is intended that the subjects play 12 rounds of the game with one round chosen at random for payment.

We decided to choose 1 round for payment at random based on theory from (Azrieli et al 2018) who discuss incentives in experiments. Subjects were paid $1 in real money for each experimental dollar earned in the experiment. Subjects were randomly re-matched each period-- though roles did not change--each round of the experiment could be considered a separate game.

Before the outbreak of the Covid-19 virus, it was planned that four treatments were to be run. The subject pool consisted of students from the Texas A&M system. All four treatments were coded in Ztree (Fischbacher 2007) and were to be run using the Economics Research lab at Texas A&M University which recruits using an ORSEE system (Grenier 2004).

Treatments

Treatment 1 is the direct revelation game without the third strategies. Meaning that each worker can either report to the staffer that they are an expert or beginner. We denote this treatment as D2. Treatment 2 is the second direct revelation game but with a third weakly dominated strategy option. Subjects will now have the opportunity to decline to report to the staffer. Treatment 2 is denoted as D3. Treatment 3 is an indirect revelation game without a weakly dominated strategy. In this treatment subjects will be shown corresponding payment options to choose from. Instead of revealing to the staffer their type, subjects play their strategy by stating which payment option they desire. This treatment is defined as I2. Treatment 4 is another indirect revelation game with a weakly dominated strategy. It follows the same principle as the treatment I2 where subjects state a desired payment option. This fourth treatment is defined as I3.

Due to the outbreak of the COVID-19 virus however, the experiment process had to be halted at the time of this publication. We do however discuss what would be predicted and the reasoning behind the hypotheses.

SECTION III

PREDICTIONS

The dependent variable being among those that are expert types, how often will they play truthful strategies which is represented by Y=Truthfulness of expert types. Movement in how truthful subjects are from the direct revelation treatments to the indirect revelation treatments is predicted to be due to the differences in language used. Recall, that subjects in the direct mechanism to play a strategy not associated with being an expert need to explicitly lie; they do not in the indirect treatment. The difference in language used is in the direct revelation treatments vs the indirect revelation treatments. Subjects would say their type directly based on tables that indicated specific payment for the two types in the direct treatments. In the indirect treatments instead of using language specific to types, there was instead secondary language. This looked like "Option A" and "Option B" versus "Expert" and "Beginner".

The change in truthfulness between the 2x2 form games and the 3x3 form games is predicted to be from the incorporation of the third weakly dominated strategy, that makes the option associated with truth-telling more appealing (see Repullo 1985). However, the third "decline to state" option while dominated could be viewed as less of an explicit lie.

Prediction 1. The treatment I2 will see $Y_{I2} = 0.5$.[1]

Prediction 2. The treatment I3 which incorporates the weakly dominated strategy will see $Y_{I3} > Y_{I2}$.

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[1] We choose 0.5 somewhat arbitrarily as a baseline, the more general prediction is Y_{I2} will be meaningfully greater than 0 and meaningfully less than 1.

Prediction 3. The treatment D2 will see $Y_{D2} > Y_{I3}$.

Prediction 4. The treatment D3 which incorporates the weakly dominated strategy will have $Y_{D3} = 1.0$ by the expert types.

SECTION IV

CONCLUSION

There are three scenarios in which the experiments could have turned out. The first being that all of the hypotheses were confirmed. This would mean that lying aversion, where the lie involves a third party that receives consequences for dishonest behavior, is effective in eliciting truthful revelation. It would also mean that removing a weakly dominated strategy that makes the truthful strategy more strategically appealing reduces truth-telling as Repullo predicts. The second scenario is that all of the hypotheses are wrong. This would stand in conflict to the great deal of empirical evidence that find that lying aversion exists, either our method was not sufficient to design lying aversion or the preponderance of empirical evidence is incorrect. The former option is far more likely. It would also mean that we do not find evidence to support Repullo's conjecture which suggests our experiments failed to make the strategic value of truth-telling in the 3x3 game prevalent. The third scenario is that some but not all of the predictions are true. If only some of the predictions were to be correct, the most likely outcome would be that either the lying aversion techniques failed or that the incorporation of the third strategy did not play a role. This difference would allow us to make a comparison in the game between which of these two factors is most effective to getting subjects to reveal the truth. If lying aversion is stronger, we have evidence that an established behavioral cost outweighs a financial one. This suggests a radical change may be necessary in mechanisms design theory. If the reverse is found, this may suggest a general issue in the incorporation of behavioral economics in mechanism design. Either way mechanism designers would need to carefully consider our results.

Again, due to the pandemic of the Covid-19 virus and the effects it had on the university system and social gatherings, the treatments were not able to be run at this time. It is unfortunate we could not continue but the process of putting together the experiment was productive none the less.

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