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A Replication and Extension of Hoffman and Spitzer's Coase Theorem Experiments

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Introduction

---*Coase Theorem* - two adversarial parties can negotiate to arrive at a Pareto Efficient and mutually advantageous agreement whenever property rights are clearly defined and zero transaction costs exist.
---Hoffman & Spitzer (1982 & 1985) had subjects engage in a bargaining exercise in which they randomly allocated unilateral decision-making authority to one person (the Controller) in each subject pair and had each pair engage in face-to-face bargaining to choose one of several payoff schemes from a payoff table that split a certain amount of money between the two subjects with a varying degree of equality.
---Each table contained a Pareto Optimal payoff choice that featured an unequal split of money favoring the person without unilateral decision-making authority (the Bargainer).

Number	Controller	Respondent
1	0.00	12.00
2	4.00	10.00
3	6.00	6.00
4	7.50	4.00
5	9.00	2.50
6	10.50	1.00
7	12.00	0.00

---The hope was that each pair of subjects could use the availability of transfers to arrive at the Pareto Optimal outcome rather than the choice that would unilaterally maximize the Controller's payoff.
---Each pair would then create a contract, which was strictly enforced, outlining a choice and an amount of money to be transferred from one player to another, if applicable.
---Curious if knowledge of a continued relationship might alter bargaining outcomes, the above strategy was implemented in sequential (two-shot) and non-sequential (one-shot) settings
---Hoffman and Spitzer used a coin flip and a game trigger in their respective treatments to determine which player would assume the role as Controller.
---Hoffman and Spitzer used words to manipulate their Moral Authority and No Moral authority treatments:

- "Earned the right" was used in MA treatments, "Designated the right" was used in No MA Treatments.

---They expected that subjects would be more self regarding in treatments with a Game Trigger, Moral Authority, and Nonsequential Bargaining.

Experimental Design and Objectives

---We conducted a replication & extension to the Hoffman and Spitzer experiments, where bargaining instead commenced via a chat box on the computers in the lab and introduce anonymity.
---Our factor design:

- Sequential bargaining with Game Trigger and Moral Authority
- Sequential bargaining with Random Assignment and No Moral Authority
- Nonsequential bargaining with Game Trigger and Moral Authority
- Nonsequential bargaining with Random Assignment and No Moral Authority

---How our experiment differs:

- Bargaining in 10 periods instead of only one or two. We also used a math game to assign entitlements for the Game Trigger sessions, and instead of a coin flip we had the computer generate random roles (Controller/Bargainer) for the Random Assignment sessions.

---Recruitment of 12 university students for each session (6 male and 6 female).
---Our expected findings:

- Initially concerned with the first two periods to compare to Hoffman and Spitzer, where we believed that subjects would be more self-regarding and selfish in a computer environment and anticipated to have fewer equal split and Pareto Optimal allocation decisions.
- We also believed that learning would occur and subjects would exhibit varying bargaining strategies as more periods were played and experience was gained throughout the session.
- We also believed that males would be more self-regarding than females.

Methods and Lab Procedures

---Four different zTree programs were developed, or one four each of our four treatments.
---Paper instructions were provided and read by the same moderator in each session.
---The instructions included various screenshots of the program to give subjects an idea of how the experiment would work.
---After reading the instructions, we tested the subjects' knowledge and understanding of the experiment via a short quiz, checking responses and answering any questions as needed.
---At the end of each session, a demographic survey was administered to obtain information that was not collected in the seminal papers.
---We paid subjects for the decisions made in two randomly chosen periods and in addition to a $5 show up fee.

Current State of Our Project

---We have only run 5 sessions so far, including

- One paper-based session:
  - Sequential bargaining with Random Assignment and NO Moral Authority
- Four computer-based sessions:
  - Sequential bargaining with Random Assignment and NO Moral Authority
  - Sequential bargaining with Game Trigger and Moral Authority
  - Nonsequential bargaining with Random Assignment and NO Moral Authority
  - Nonsequential bargaining with Game Trigger and Moral Authority

---For all periods (but primarily the first two), we were interested in the number of:

- Equal split decisions
- Pareto Optimal decisions
- Equal split decisions within +/- $1

---On average, each decision period lasted around 6 minutes for the computer-based sessions.

Inducing Self-Regarding Behavior

Equal Split (out of 6 decisions in each period)

Period	Game/Sequential	Random/Sequential	Game/Non-sequential	Random/Non-sequential
1	1	2	1	0
2	1	3	0	1
3	2	5	1	1
4	1	5	0	0
5	0	4	0	3
6	1	4	0	0
7	1	5	0	3
8	1	5	0	0
9	1	4	0	2
10	1	3	0	0
Total	10	40	2	10
		67%		17%
		Hoffman&Spitzer 100%		Hoffman&Spitzer 42%

Subjects behave more self-regarding (less equal split payoffs) when

- They feel more entitled to the controlling right.
- They know that there is no retaliation for behaving self-regarding.

Random/Sequential

Equal Splits (out of 6 decisions in each period)

Period	Computer Interface	Paper Version
1	2	4
2	3	3
3	5	4
4	5	5
5	4	5
6	4	5
7	5	4
8	5	4
9	4	5
10	3	5
Total	40 (67%)	44 (73%)

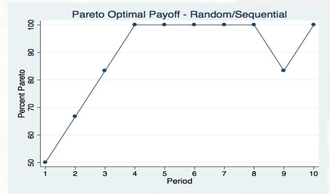
Subjects behave more self-regarding when using the computer interface

- Anonymity .
- Protected behind the screen (vs. face-to-face).

Gender Differences

---More Pareto Optimal outcomes and split decisions were expected as the sessions progressed.
---We believed that females subjects would be less self-regarding than their male counterparts.
---We believed female subjects would be more willing to engage in bargaining.
---It appeared that subjects' strategies changed as they experienced things like getting 'screwed'.
---One female subject expressed her 'kindness' strategy until experiencing self-regarding behavior by her partner.
---We also believed that recurrences of the number of times subjects were Controllers/Bargainers might have an effect on their attitude towards sharing.

Learning Over 10 Periods



Percentage of Pareto Optimal Choices

Period	Game/Sequential	Random/Sequential	Game/Non-sequential	Random/Non-sequential
1	33	50	67	0
2	83	67	17	83
3	67	83	83	67
4	83	100	33	83
5	83	100	67	50
6	67	100	50	17
7	83	100	83	100
8	50	100	67	50
9	67	83	83	83
10	83	100	50	67

	(1) Game/Sequential	(2) Random/Sequential	(3) Game/Non-sequential	(4) Random/Non-sequential
period	1.414	3.939*	2.222	3.232
	(0.73)	(2.59)	(0.89)	(0.92)
_cons	62.22***	66.67***	47.78*	42.22
	(5.15)	(7.07)	(3.07)	(1.94)
N	10	10	10	10

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Pareto Optimal Choices

- See clear learning effects that subjects learnt to choose pareto optimal choices as the sessions progressed in the Random/Sequential session
- The learning effects are less clear in other sessions

Equal Splits

- Does not seem to be learning effects.
- Decision to split equally does not seem to depend on experience

Percentage of Equal Splits

Period	Game/Sequential	Random/Sequential	Game/Non-sequential	Random/Non-sequential
1	17	33	17	0
2	17	50	0	17
3	33	83	17	17
4	17	83	0	0
5	0	67	0	50
6	17	67	0	0
7	17	83	0	50
8	17	83	0	0
9	17	67	0	33
10	17	50	0	0

Conclusion, Extensions, and Further Needs

---We plan to run more sessions for each treatment this fall.
---More on gender and learning effects.
---Are Texans or folks in College Station "nicer", on average, than students in other states or universities?
---Can this type of bargaining platform be introduced to solve real world situations such as bargaining over things like water rights and transfers?
---Looking for additional recommendations for how we can improve the paper or new ways to analyze our findings.

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