

# MW24.2 Experimental Economics (SS2022)

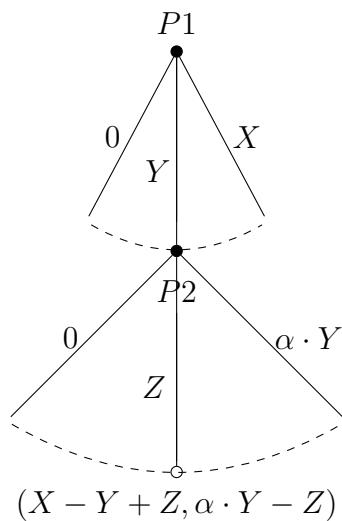
## Trust and Reciprocity

Olexandr Nikolaychuk

### Trust Game

~ also, investment game, sequential Prisoner's Dilemma etc.

- \* Two-person sequential move game. The *trustor* is endowed with a budget of  $X$  and sends a portion of it,  $Y$ , s.t.  $0 \leq Y \leq X$ , to the *trustee*. The *amount sent* gets multiplied by  $\alpha > 1$ . The trustee then *sends back* some amount  $Z$ , s.t.  $0 \leq Z \leq \alpha \cdot Y$ . The payoffs are  $X - Y + Z$  and  $\alpha \cdot Y - Z$ , respectively [Berg et al., 1995].



- \* SPNE:  $\{Y^* = 0; Z^* = 0\}$

- \* surplus (efficiency) maximization:  $\{Y^* = X; Z^* \in [0, \alpha \cdot Y^*]\}$

- \* *rational* (i.e., selfish) trustor can make positive transfers if the trustee is expected to be *irrational*

*Trust* as a means of a *joint* improvement over the subgame-perfect outcome:

- \* placing trust in the trustee puts the trustor at risk
  - \* the trustee's decision benefits the trustor at a cost to the trustee
  - \* both players can benefit from the transaction
- $\Rightarrow$  *Reciprocation hypothesis* [e.g., Rabin, 1993]<sup>1</sup> suggests that the amounts sent and returned should be *positively* correlated

---

<sup>1</sup>Matthew Rabin. Incorporating fairness into game theory and economics. *American Economic Review*, 83(5):1281–1302, 1993

## Reciprocity (direct<sup>2</sup> & strong<sup>3</sup>) [Rabin, 1993]:

- \* people are willing to sacrifice their own material well-being to help others who are being kind
  - \* people are willing to sacrifice their own material well-being to punish others who are being unkind
  - \* both motivations have a greater effect on behavior as the material cost of sacrificing becomes smaller
- ⇒ players care not only about the others' actions but also about their motives
- ⇒ non-N.E. strategies can be supported by “fairness equilibrium” conditional on beliefs

## Berg et al. [1995]

- \* between-subject; double-blind; treatments: no history and social history
  - \* *both* players have endowments of 10; multiplier = 3
  - \* social history treatment ← behavioral data from the no history treatment
- (?) is trust evolutionary viable (i.e., can it have emerged as a norm)?

no history [Fig. 2]:	social history [Fig. 3]:
⇒ 30/32 send posit. amounts	⇒ 25/28 send posit. amounts
⇒ 5.16 sent and 4.66 returned (avg)	⇒ 5.36 sent and 6.46 returned (avg)
⇒ transfers of 5 or 10 → <i>positive</i> net returns (i.e., all-or-nothing norm) [Appendix B]	⇒ 5 → 7.14 and 10 → 13.17; 5 or 10 sent in 50% cases
	⇒ reciprocation hypothesis confirmed

## Trust (reciprocity) versus altruism/inequality aversion:

- \* transfers resulting from other-regarding preferences do *not* depend on the behavior of others [e.g., inequality aversion à la Fehr and Schmidt, 1999]
- \* transfers resulting from trust or reciprocity are *conditional* on the behavior of others [e.g., Rabin, 1993]

---

<sup>2</sup>Immediate interaction between the players as opposed to, e.g., A interacting with B and B interacting with C

<sup>3</sup>Without positive payoff consequences for oneself

## Cox [2004]

- ~ reciprocity (trust)  $\Leftrightarrow$  conditional kindness
- ~ other-regarding preferences  $\Leftrightarrow$  unconditional kindness
- \* to trust is to have a particular *belief* about the behavior of others
- (!) even *selfish* trustors will make transfers if the expected net return is positive
- \* check if Berg et al. [1995] results are indeed due to trust (reciprocity) or rather due to other-regarding preferences
- \* treatments (between-subject):
  - $A \sim$  control [Berg et al., 1995]
  - $B \sim$  trustee is passive
  - $C \sim$  trustor is passive (transfers taken from  $A$ ; unknown to the trustees to avoid *indirect* reciprocity)
- $\Rightarrow$  26/32 trustors send positive amounts in  $A$ ; 5.97 on average [Fig. 1]
- $\Rightarrow$  19/30 trustors send positive amounts in  $B$ ; 3.63 on average [Fig. 2, Table 1]
- $\Rightarrow$  17/32 trustees return positive amounts in  $A$ ; 13/32 in  $C$
- $\Rightarrow$  average back transfers of 4.94 and 2.06 in  $A$  and  $C$ , respectively [Fig. 3]
- $\Rightarrow$  both other-regarding and reciprocal behavior observed [ $B$ ,  $C$  and  $B - A$ ,  $C - A$ ]

## Reciprocity (Gift Exchange) Game

~ contrary to the Trust game, it is the *second* player who ‘generates’ welfare

- \* Two-person sequential move game. The *employer* offers wage  $w$ , s.t.  $w \in [\underline{w}, \bar{w}]$ . Upon observing  $w$ , the *worker* chooses effort level  $e$ , s.t.  $e \in [\underline{e}, \bar{e}]$ . The respective payoffs are  $v \cdot e - w$  and  $w - c(e)$ , s.t.  $c(e) \sim \text{convex}$ ,  $c(\underline{e}) = 0$ , and  $v > 0$  [Fehr et al., 1993].

⇒ SPNE:  $\{w^* = \underline{w}; e^* = \underline{e}\}$

⇒ surplus (efficiency) maximizing outcome:  $c'(e) = v \Rightarrow e^* > \underline{e}$

### Fehr et al. [1993]

~ test of the “fair wage-effect” hypothesis (i.e., higher wages lead to higher effort levels even in the absence of penalties for shirking)

\* stage 1:

- employers make wage proposals (progressive one-sided oral auction)
- workers decide whether or not to accept ( $\#\text{employers} < \#\text{workers}$ )

\* stage 2:

- hired workers choose their effort level [Table 1]

\* 12 repetitions; matching identities unknown (i.e., stranger matching)

\* payoffs =  $\{(126 - p) \cdot e; p - m(e) - 26\}$  or  $\{0; 0\}$

~ price of labor should converge to the market clearing wage under the “no fairness” hypothesis ( $p^* = 30$  since the wages had to be multiples of 5)

⇒ lowest price of 30 observed only once out of 276 cases

⇒ average price was 72, providing 42% of the surplus to the worker

⇒ minimum effort chosen in 16% cases, average was 0.4

⇒ wage and effort level are *positively* correlated [Table 2, Fig. 1]

⇒ reciprocal behavior persists over time [Fig. 2]

## Suggested Literature

- Charles A Holt. *Markets, games, & strategic behavior*. Boston Pearson Addison Wesley, 2007 [Chapter 24]
- Joyce Berg, John Dickhaut, and Kevin McCabe. Trust, reciprocity, and social history. *Games and Economic Behavior*, 10(1):122 – 142, 1995
- James Cox. How to identify trust and reciprocity. *Games and Economic Behavior*, 46(2):260–281, 2004
- Ernst Fehr, Georg Kirchsteiger, and Arno Riedl. Does fairness prevent market clearing? an experimental investigation. *The Quarterly Journal of Economics*, 108(2):437–459, 1993
- \* Ernst Fehr and Bettina Rockenbach. Detrimental effects of sanctions on human altruism. *Nature*, 422(6928):137–140, 2003