

Social capital and its law of motion: theory and evidence from field experiments

EconomEtica

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e la responsabilità sociale di impresa



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References

- Berg J., Dickaut J. and McCabe K. (1995). Trust, reciprocity and social history. *Games and Economic Behaviour* 10: 122-42.
- Johnson, Noel D., and Mislin A., (2011)"Trust games: A meta-analysis." *Journal of Economic Psychology* 32.5: 865-889.
- Becchetti L. Conzo P. (2011), “, 2011, Creditworthiness as a signal of trustworthiness”, *Journal of Public economics*, Volume 95, Issues 3-4, pp. 265-278.

The homo economicus is socially harmful..when self-interest fails

- *«Your corn is ripe to-day; mine will be so tomorrow. It is profitable for us both, that I should labour with you to-day, and that you should aid me to-morrow. I have no kindness for you, and know you have as little for me. I will not, therefore, take any pains upon your account; and should I labour with you upon my own account, in expectation of a return, I know I should be disappointed, and that I should in vain depend upon your gratitude. Here then I leave you to labour alone: You treat me in the same manner. The seasons change; and both of us lose our harvests for want of mutual confidence and security. .» (Hume Treatise on Human Nature, 1740, book III*

The secret of the wealth of regions,
nations, companies is social capital
(trust + trustworthiness) but trust is
social risk

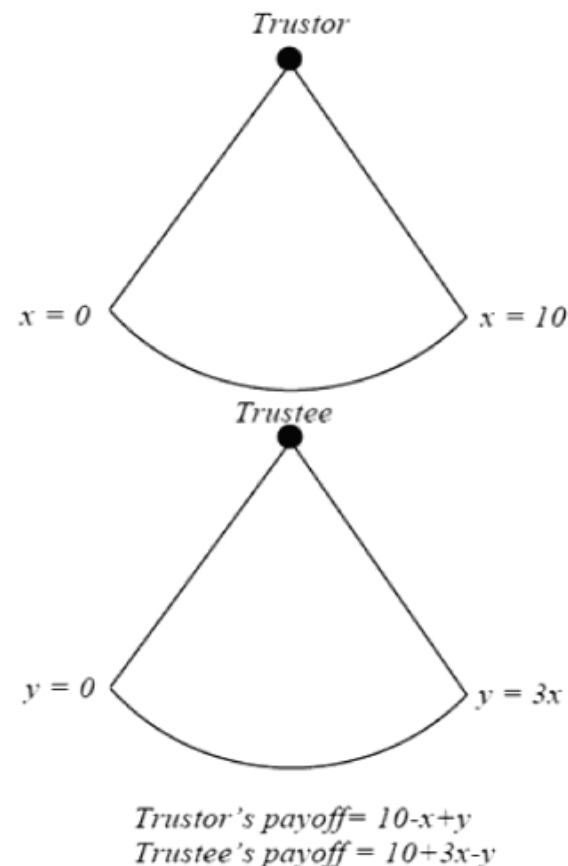


The virtuous circle



The investment (trust) game

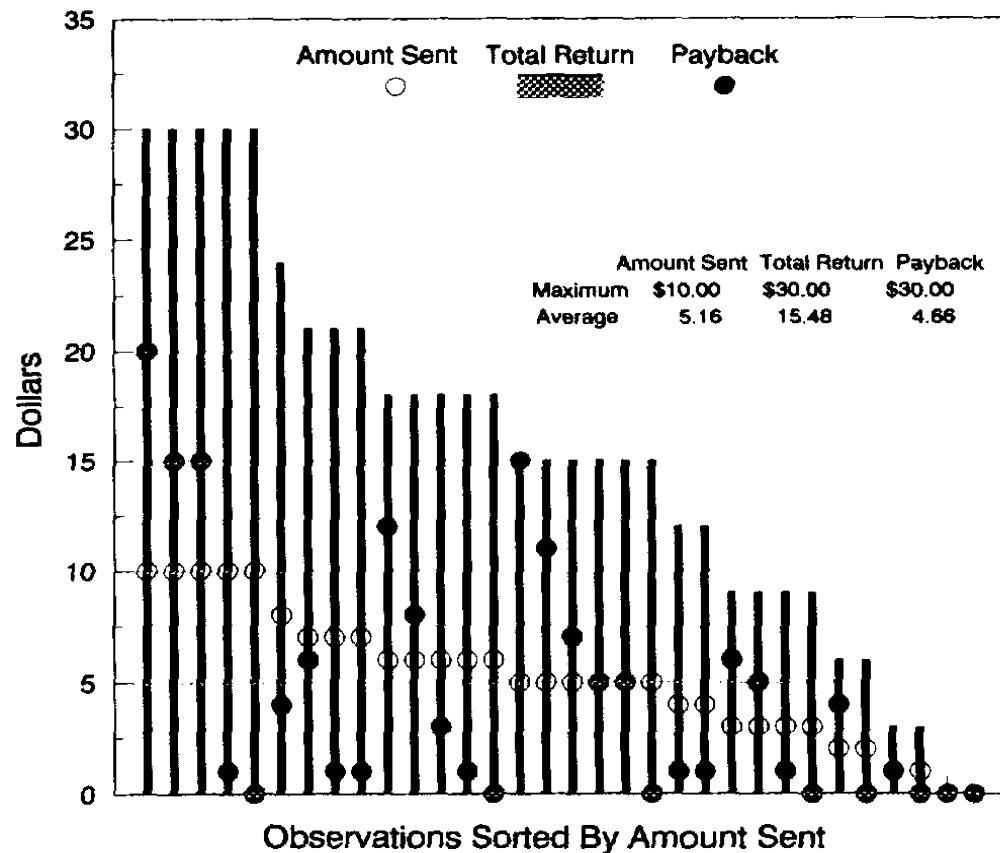
- Standard two-player investment games (see Berg, Dickhaut and McCabe, 1995)
- Strategies: Team cooperative equilibrium (10,10) Nash (common knowledge) equilibrium (0,0)
- Payoffs: Team cooperative equilibrium (25,25) NE (10,10),



First experimental evidence of departure from NE....

Investment game [Berg, Dickhaut e McCabe 1995].

- only 2 of 32 subjects send 0 (Nash players are a minority)
- 12 of 28 subjects B, who were sent $i > 0$, returned \$0 or \$1
- 11 sent back more than they received
- investments of \$5 had an average payback of \$7
- investments of \$10 resulted in payback of \$10.2
- Trust sometimes is not repaid (amount sent > payback) but always creates (total return > amount sent)..why superadditivity embedded in the game ?



Previous results

- The dismal outlook: those closer to the NE are the business students...
- Trustor contribution for: strategic altruism, pure altruism, inequity aversion, betrayal aversion, risk aversion, guilt aversion
- Trustee contribution for: reciprocity, pure altruism, inequity aversion, , risk aversion, guilt aversion

Fehr (2010), “[...] *Betrayal aversion means that people dislike non-reciprocated trust*”

Self-Interest is the basis of old game theory

“Men seek principally their own conservation, and sometimes delectation [enjoyment] only” [Hobbes, 1651]

“Political economy is concerned with man solely as a being who desires to possess material wealth” [Mill, 1836]

“The first principle of economy is that agents are actuated only by their self-interest” [Edgeworth, 1881]

“The fundamental behavioral principle in economics is that human beings are selfish and rational utility maximizers” [Mueller, 1989]

“People are fundamentally amoral, ignoring rules, breaking agreements, and employing guile, manipulation, and deception if they see personal gain in doing so” [Milgrom & Roberts, 1992]

...but what is our long-sighted self-interest i) in a life made by social dilemmas and ii) given our human nature revealed by the

But self-interest is just one option

Different forms of (other-regarding) behaviour

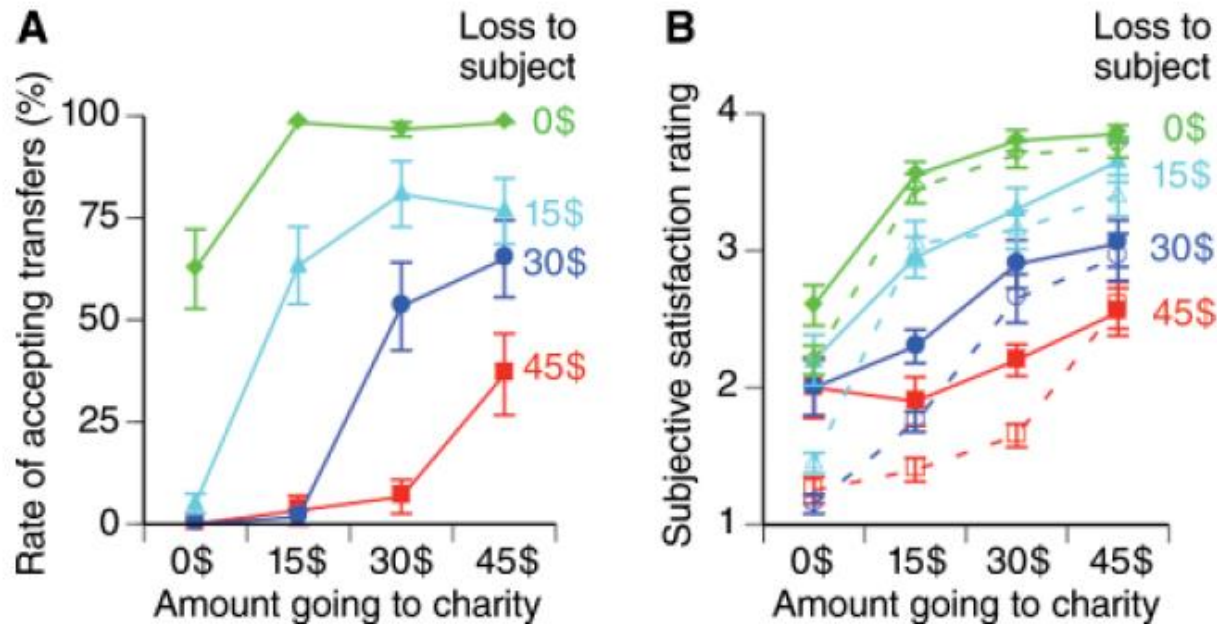
	Cost for self	Benefice for self
Benefice for others	<i>Altruism</i>	<i>Mutualism</i>
Cost for others	<i>Spite</i>	<i>Selfishness</i>

Utility function in presence of «selfishness»:
utility grows only under the increase of one's
own monetary payoffs

Le tre dimensioni (e il dilemma) del bene:

- i) Il fascino (warm glow) del dare anche x il più malvagio
- ii) La difficoltà dell'acquisizione di un abito virtuoso che lo renda stabile e permanente
- iii) Il dilemma politico della razionalità cooperativa superiore a quella individuale tradita dall'opportunismo dal fallimento della cooperazione

Gli aiuti al bene: formazione, esperienza, aiuti fiscali e di regole del gioco



Harbaugh, W., Mayr, U., Burghart, D., (2007). [Neural Responses to Taxation and Voluntary Giving Reveal Motives for Charitable Donations](#). *Science*, 316 no. 5831 pp. 1622-1625

Which altruism?

Pure Altruism (Others' well-being positively or negatively affect my well-being – Active and Passive stance)

Warm-glow (Others' well-being positively or negatively affect my well-being insofar I'm influencing it – Active stance)

Warm-glow implies generativity, that is, capacity to influence positively lives of other human beings

Mayr, U., Harbaugh, W., Tankersley, D., 2009, The Neuroeconomics of Charitable Giving and Philanthropy, in Paul Glimcher et al. Ed., *Neuroeconomics, Decision Making and the Brain*. Elsevier NYC. 2009.

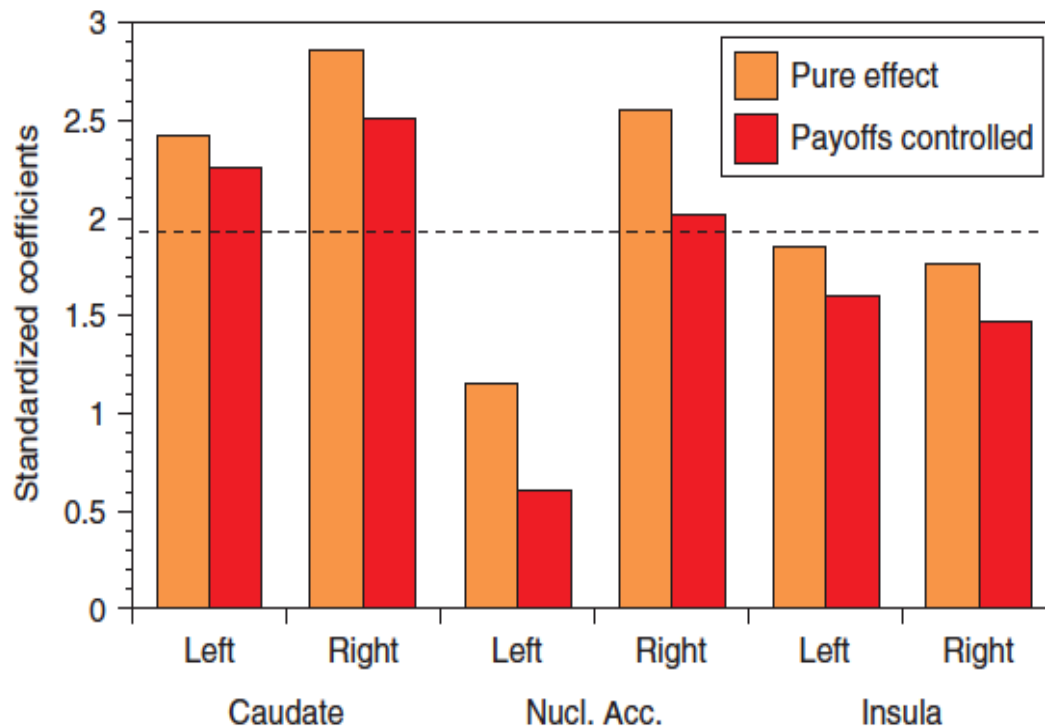


FIGURE 20.4 Higher activation when transfers are voluntary. The figure shows that activation in the indicated areas is generally higher in voluntary than in mandatory transfers.

Pelligra, V., Stanca, L., (2010), *To Give or Not To Give? Equity, Efficiency and Altruistic Behavior in a Survey-Based Experiment*, CRENoS, Working Paper Number 2010_32

611 Subjects

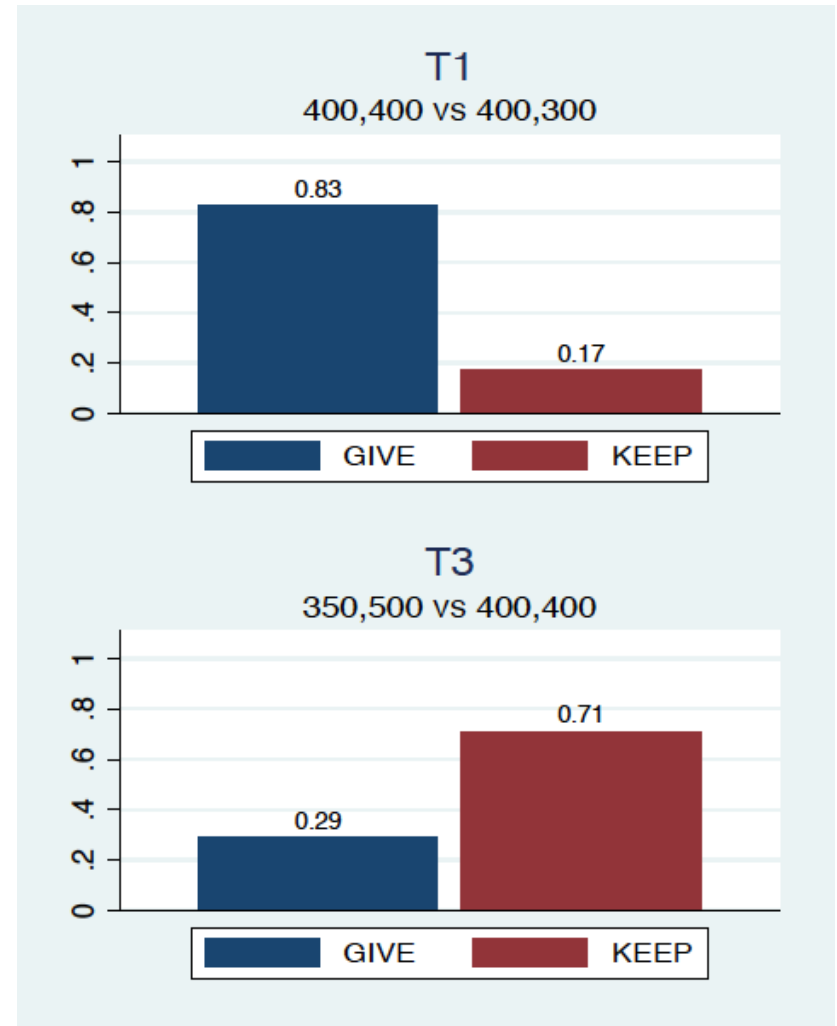
Representative Sample

Real incentive

Telephone Interviews

H(T1): $p(\text{give})=p(\text{keep})$

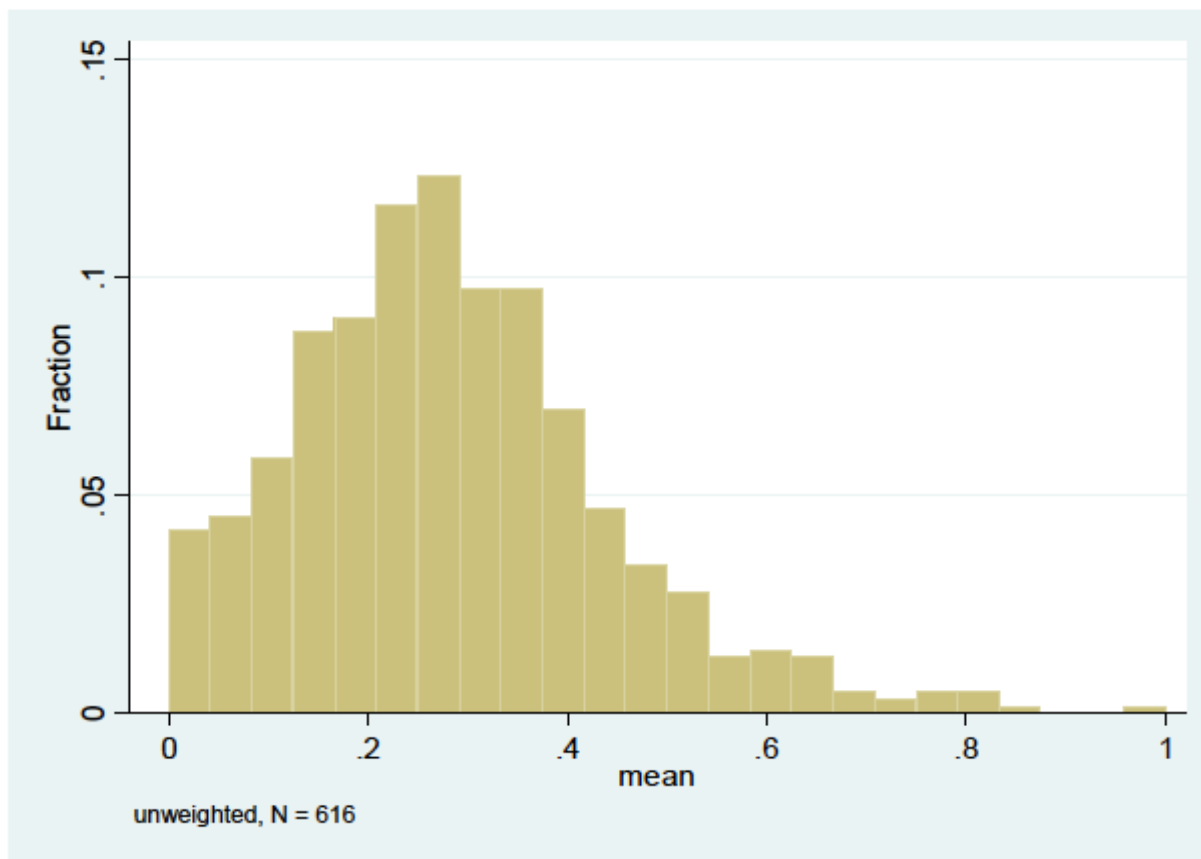
H(T2): $p(\text{give})=0$



Engel C., 2011. Dictator Games: A Meta Study, [*Experimental Economics*](#), 14(4), pp. 583-610

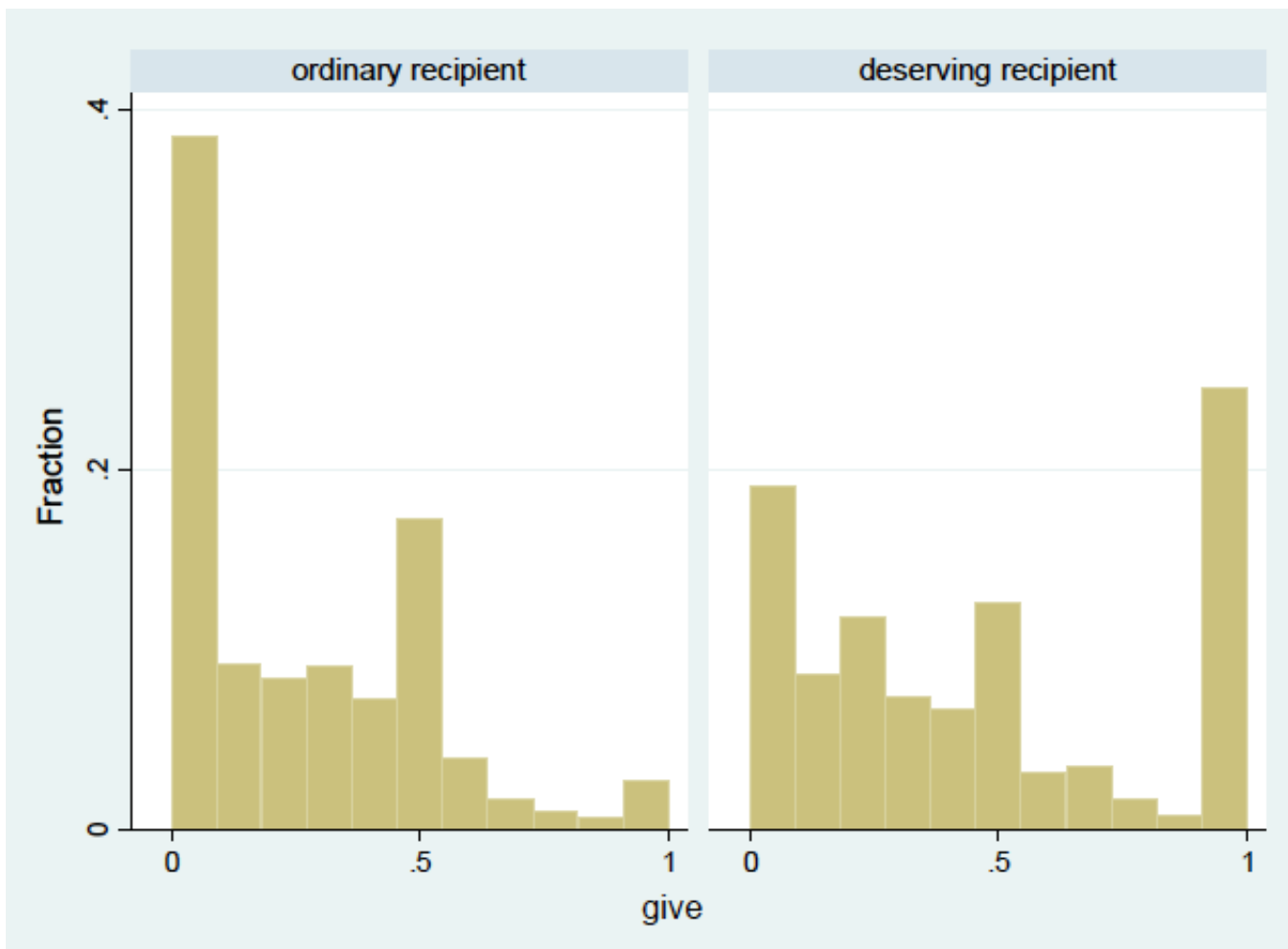
129 studies published between 1992 and 2010

Only a very small fraction of individuals follow a Nash / purely self-regarding behavior in dictator games



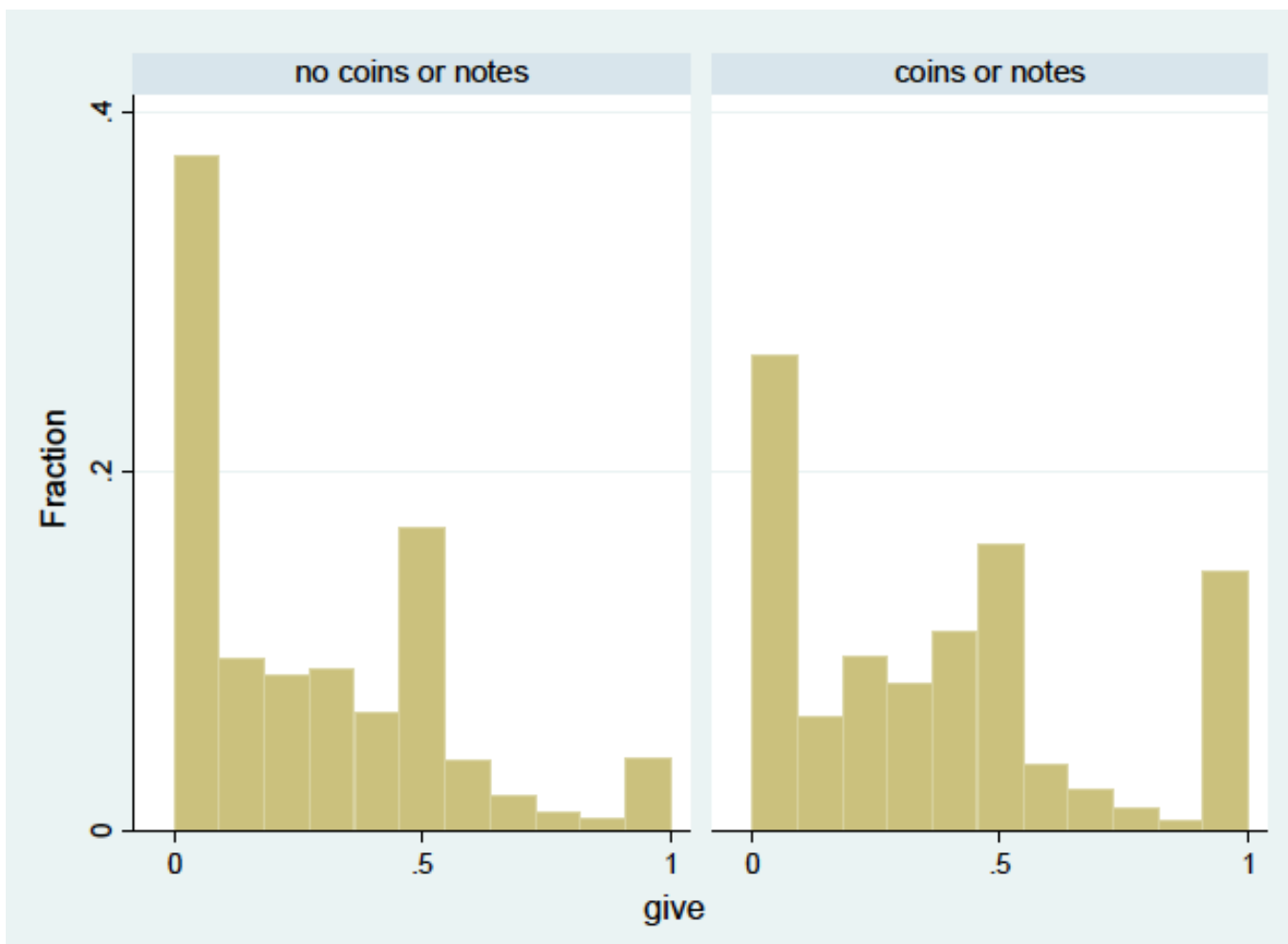
Mean offer (28%) (only 6 out of 616 treatments have mean =0)

Engel C., 2011. Dictator Games: A Meta Study, [*Experimental Economics*](#), 14(4), pp. 583-610



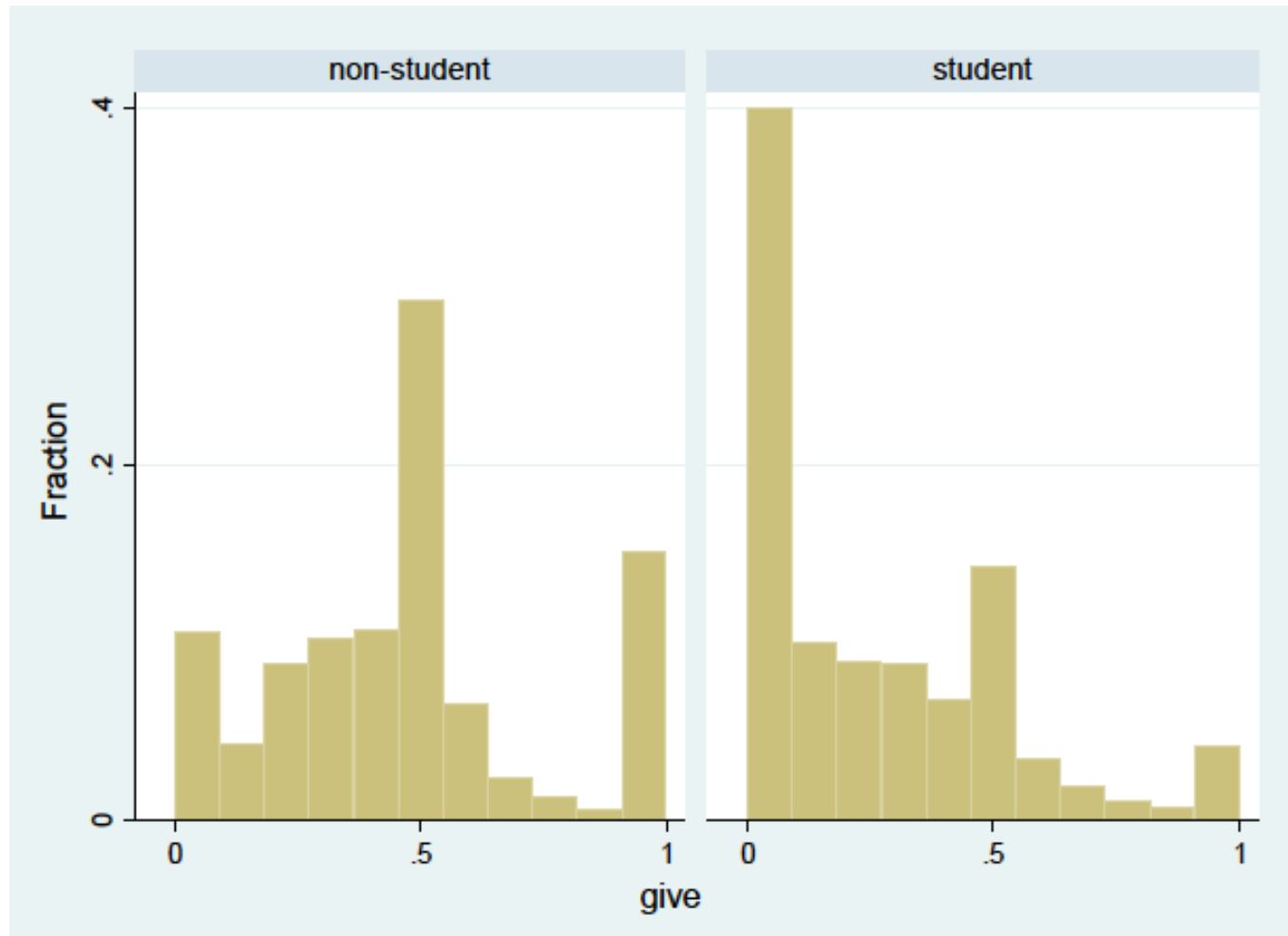
Who's the recepient?

Engel C., 2011. Dictator Games: A Meta Study, [*Experimental Economics*](#), 14(4), pp. 583-610



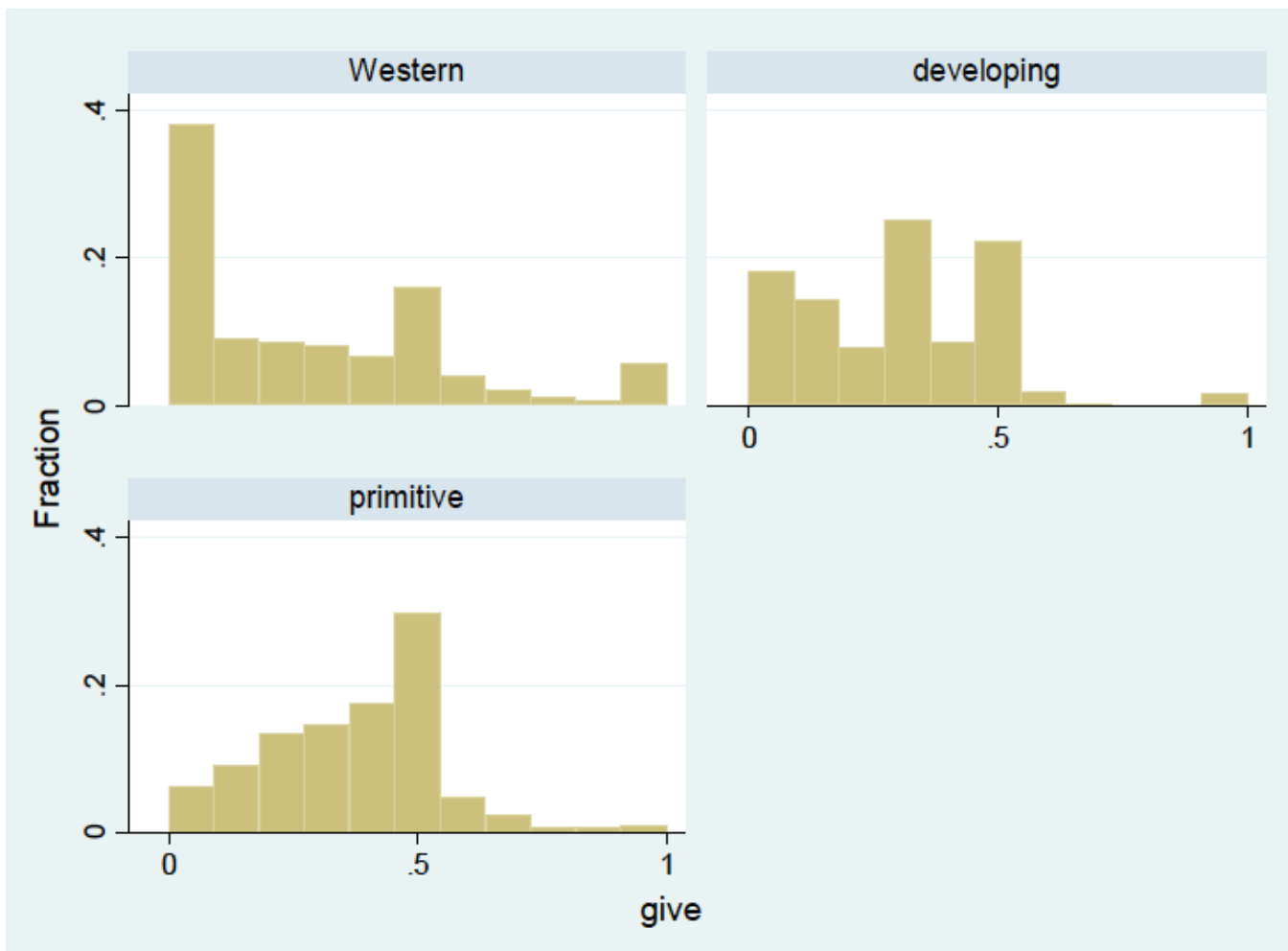
The effect of the incentive

Engel C., 2011. Dictator Games: A Meta Study, [*Experimental Economics*](#), 14(4), pp. 583-610



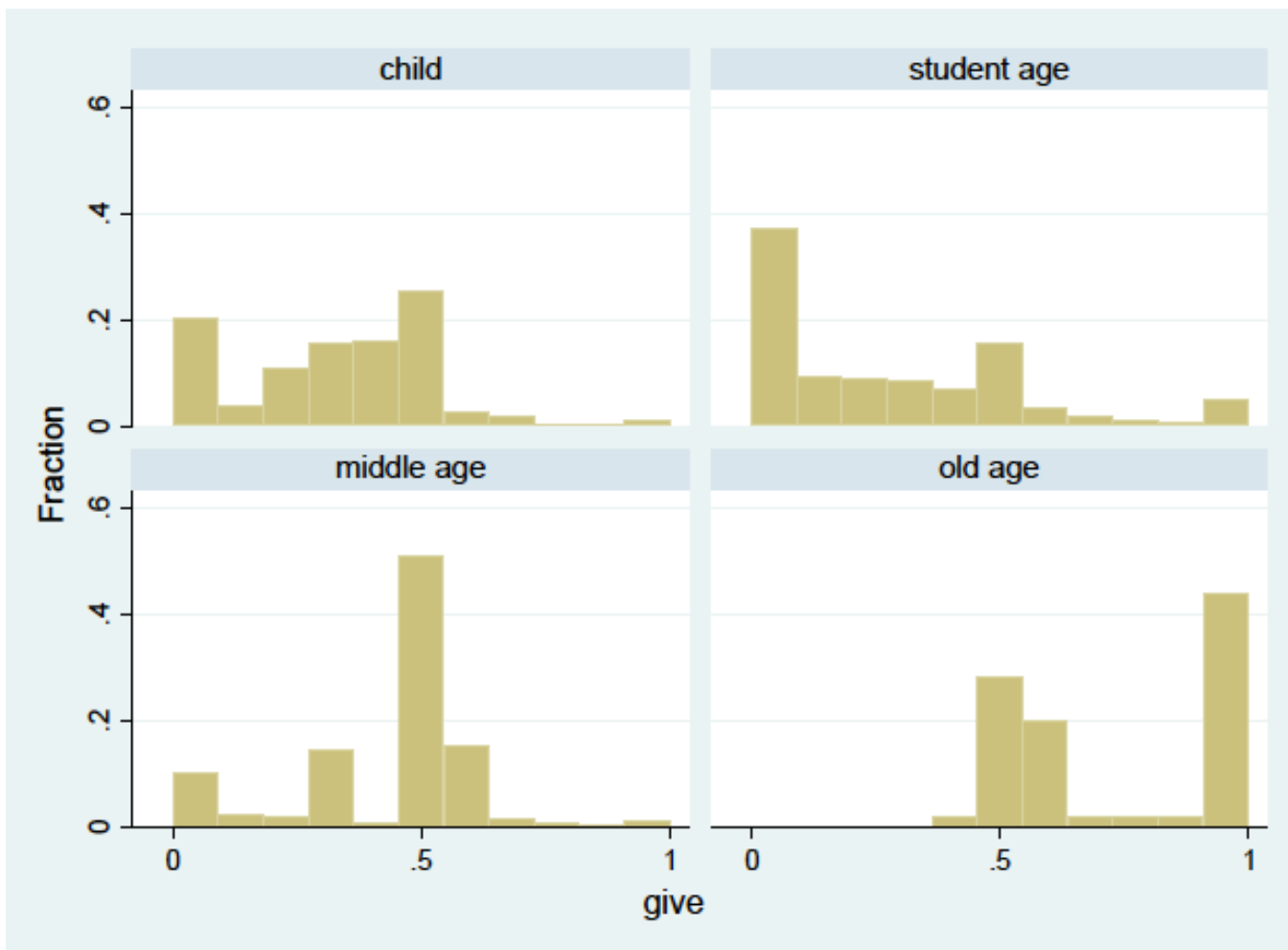
Different subject pools

Engel C., 2011. Dictator Games: A Meta Study, [*Experimental Economics*](#), 14(4), pp. 583-610



The effect of cultural background

Engel C., 2011. Dictator Games: A Meta Study, [*Experimental Economics*](#), 14(4), pp. 583-610



The effect of age

Ultimatum Game

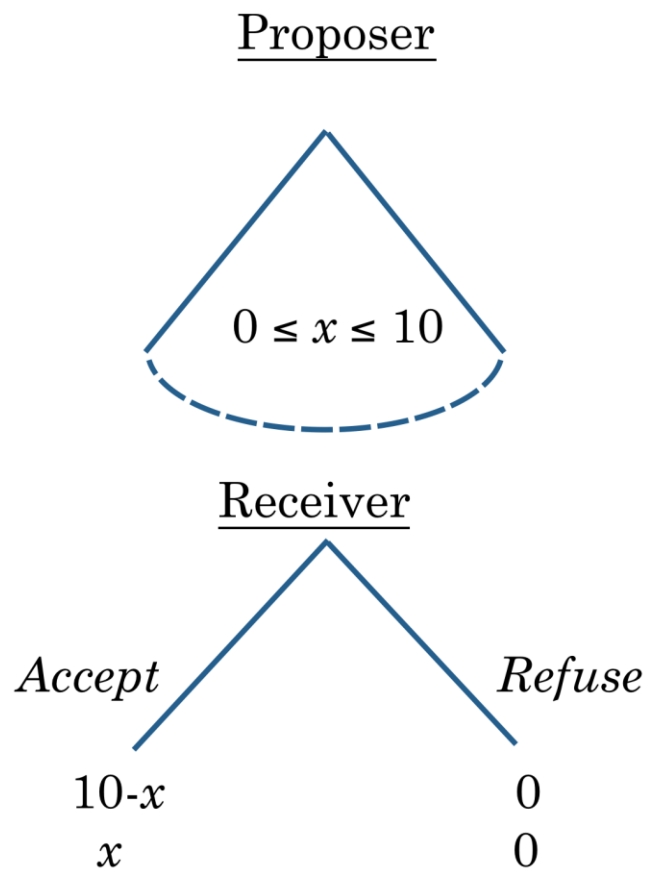
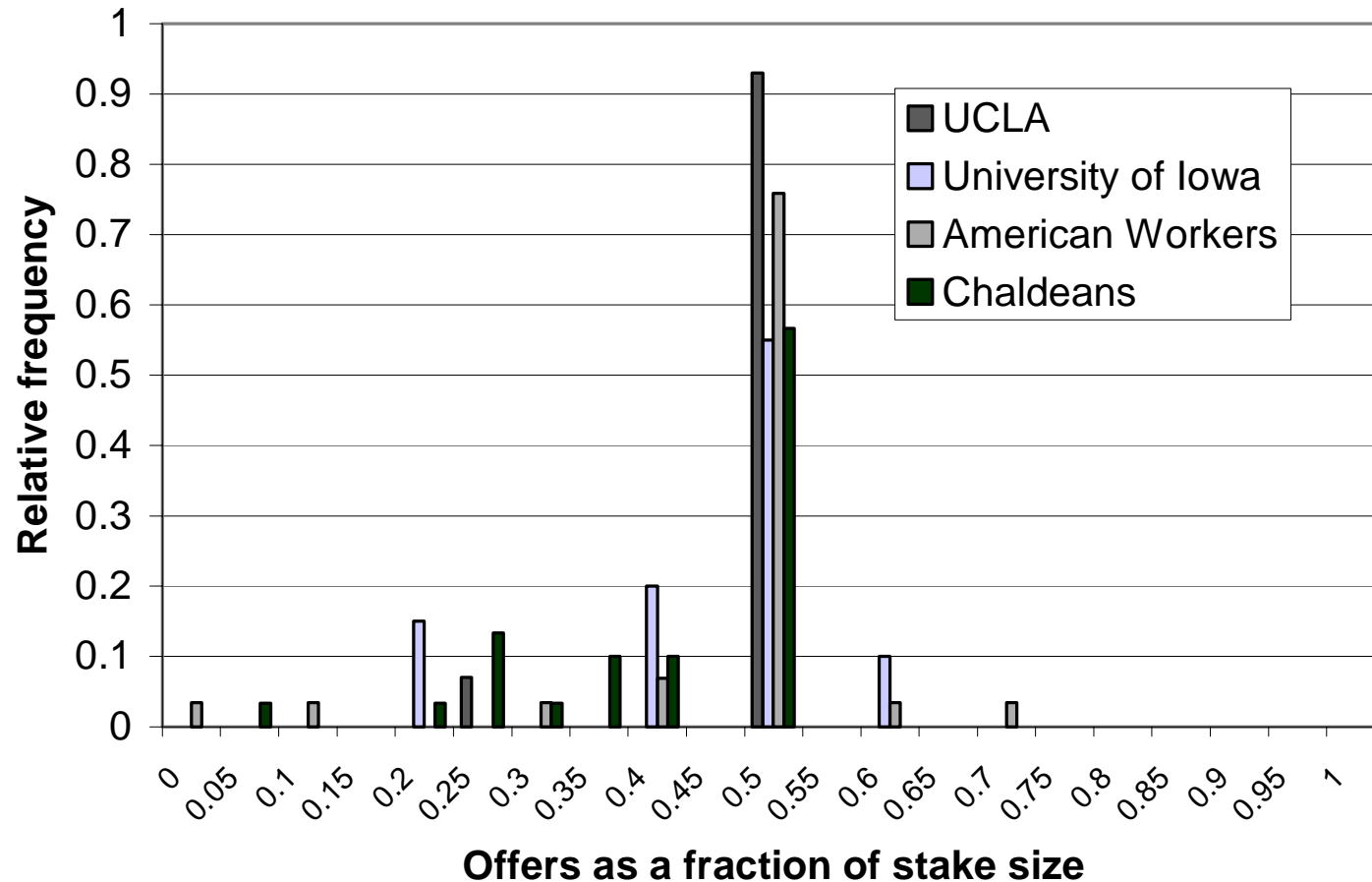


Figure 3: Distribution of ultimatum offers



Structure

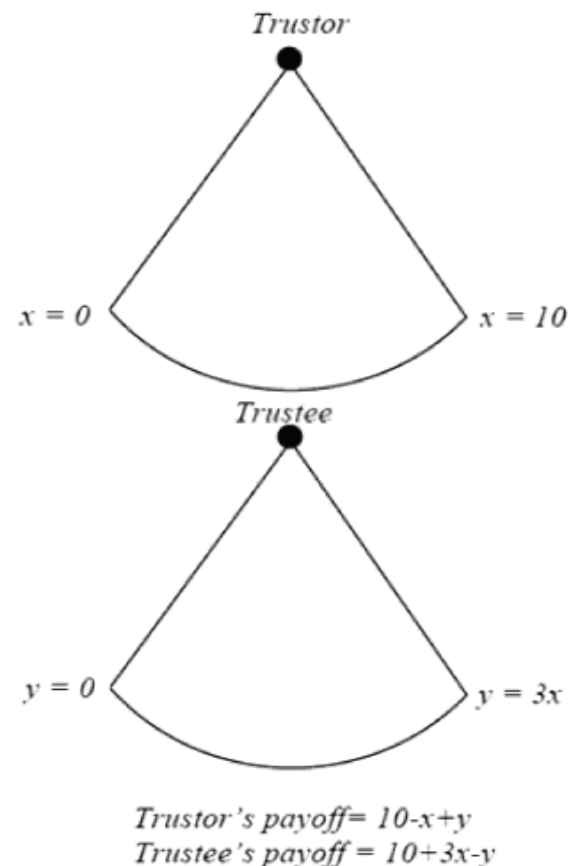
1. Social capital and trust: state of art
2. The trust game corporation
3. Trust and microfinance (experiments in Buenos Aires suburbs)
4. Trust and the reduction of social distance
5. Trust and cooperative membership (experiment among fair trade producers in the Phillipines)
6. The generating power of trust
7. The literature and experiment findings on other-regarding preferences
8. The erosion of trust

Five components of social capital

- trust
- trustworthiness
- trust on institutions (linking social capital)
- civicness
- willingness to pay for public goods

The investment (trust) game

- Standard two-player investment games (see Berg, Dickhaut and McCabe, 1995)
- Strategies: Team cooperative equilibrium (10,10) Nash (common knowledge) equilibrium (0,0)
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Some definitions of trust (1)

- *Trust is the investor's willingness to make herself vulnerable to others' action.*

Hong and Bohnet (2007)

- *“an individual (let's call her the trustor or investor) trusts if she voluntarily places resources at disposal of another party (the trustee) without any legal commitment from the latter”.*

Fehr (2009)

niente è più necessario ad una grande e pronta circolazione, quanto la fede pubblica.[...] La confidenza è l'anima del commercio [...] senza di essa tutte le parti che compongono il suo edificio, crollano da se medesime.

Gaetano Filangieri, *Scienza della Legislazione* (1780)

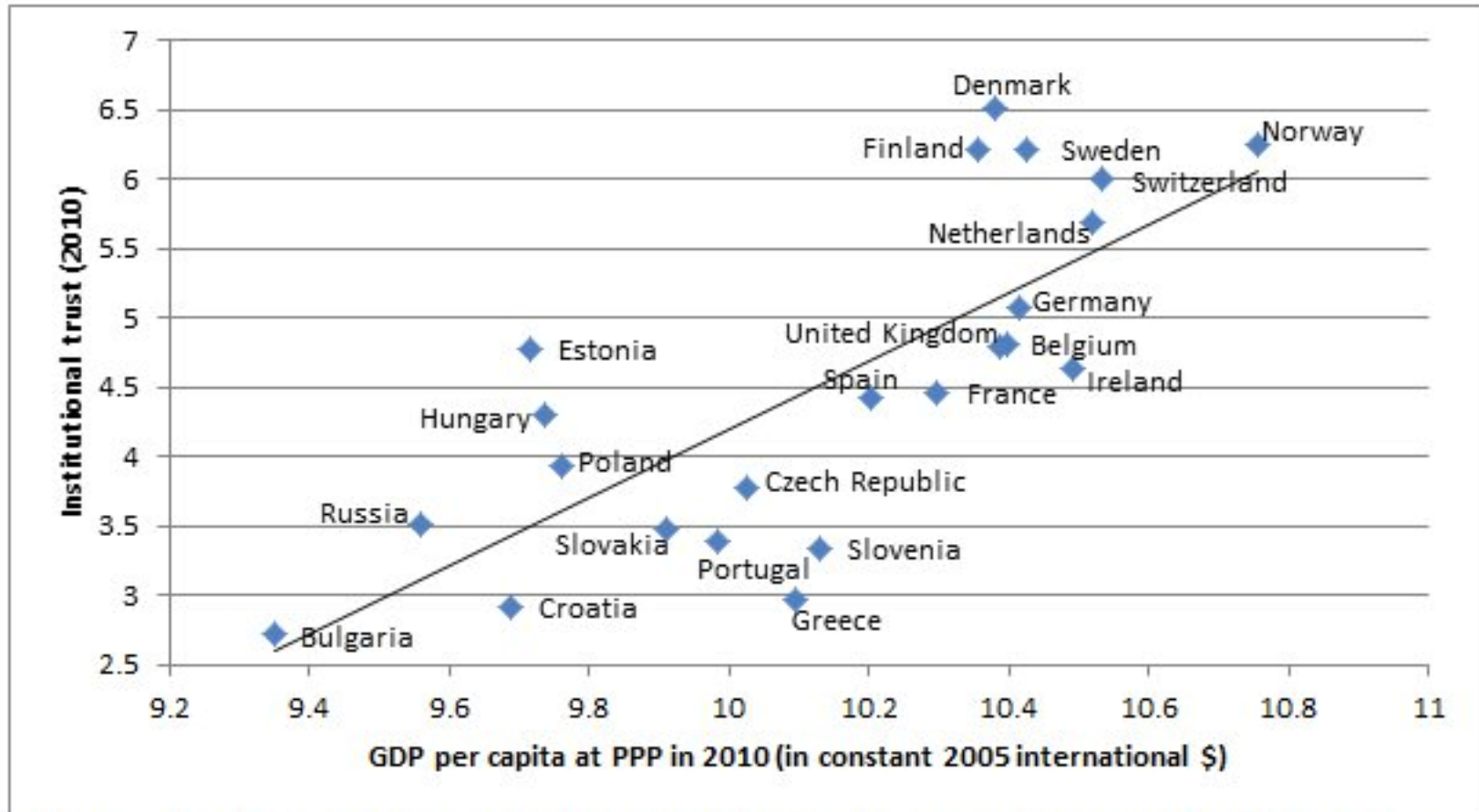
- Trust is crucial but fragile
- Why?
- How?
- Policy Implications.

Trust is *vinculum societatis* (the bond of society)
(J. Locke);

“The advantage of humankind of being able to trust one another, penetrates into every crevice and cranny of human life: the economical is perhaps the smallest part of it, yet even this, is incalculable”. (J.S. Mill)

Trust is the “lubricant of the social system (...) much of the economic backwardness in the world can be explained by a lack of mutual confidence”, (K. Arrow).

institutional trust and per capita GDP



Source: European Social Survey + World Bank (2010)

Trust matters for measurable economic performance (Knack & Keefer, 1997):

- more equal incomes
- just institutions
- better-educated and homogeneous populations

Trust has positive effects on (Guiso et al., 2004, 2005):

- financial development
- foreign trade

- Trust has a positive impact on organizational success (Kramer & Tyler, 1996)
- Trust, trustworthiness and individual well-being (Helliwel, 2002)

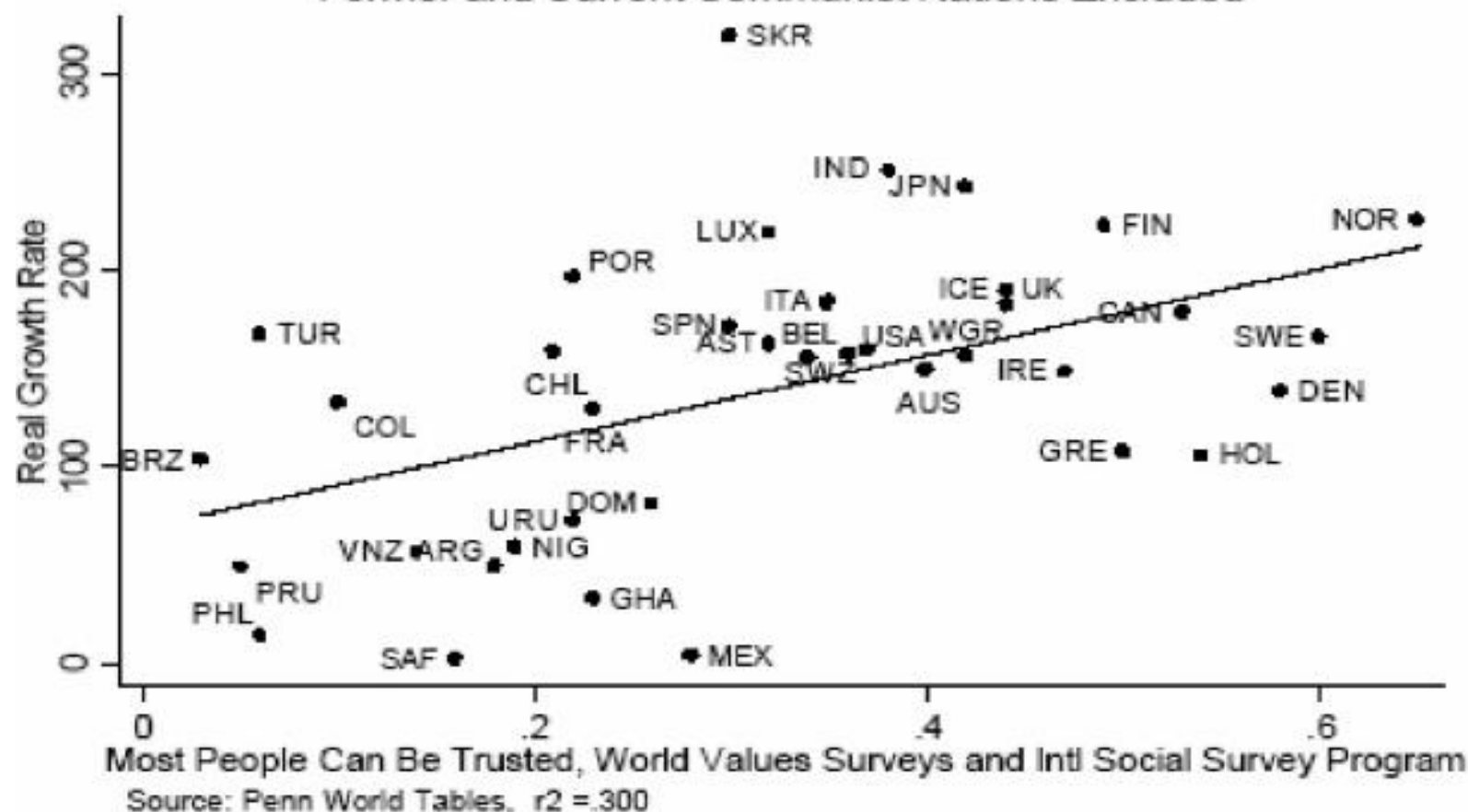
To sum up: the productivity of social capital (1)

- At micro level trust games are the best representation of life: life is done by sequential games in which a trustor takes “social risk” sharing something with a trustee with the risk of being abused. If the trustee is trustworthy and does not abuse, superadditivity and putting the puzzle together create additional value.
- Being individualistic is harmful also from an economic point of view, the paralysis of trust hampers the creation of economic value. Only a minority of individuals follow Nash rationality
- Social capital is a “lubricant of economic activity” (Arrow, 1974)
- Its microeconomic dimension (trust and trustworthiness) has important productive effects under informational asymmetries, incomplete contracts and weak enforcement of formal contracts
- In the literature: positive effect of the level of trust on economic growth and on institutions (Knack and Keefer, 1997 and Zak and Knack, 2001 for the former and Putnam, 1993 and La Porta et al., 1997)

The productivity of social capital (2)

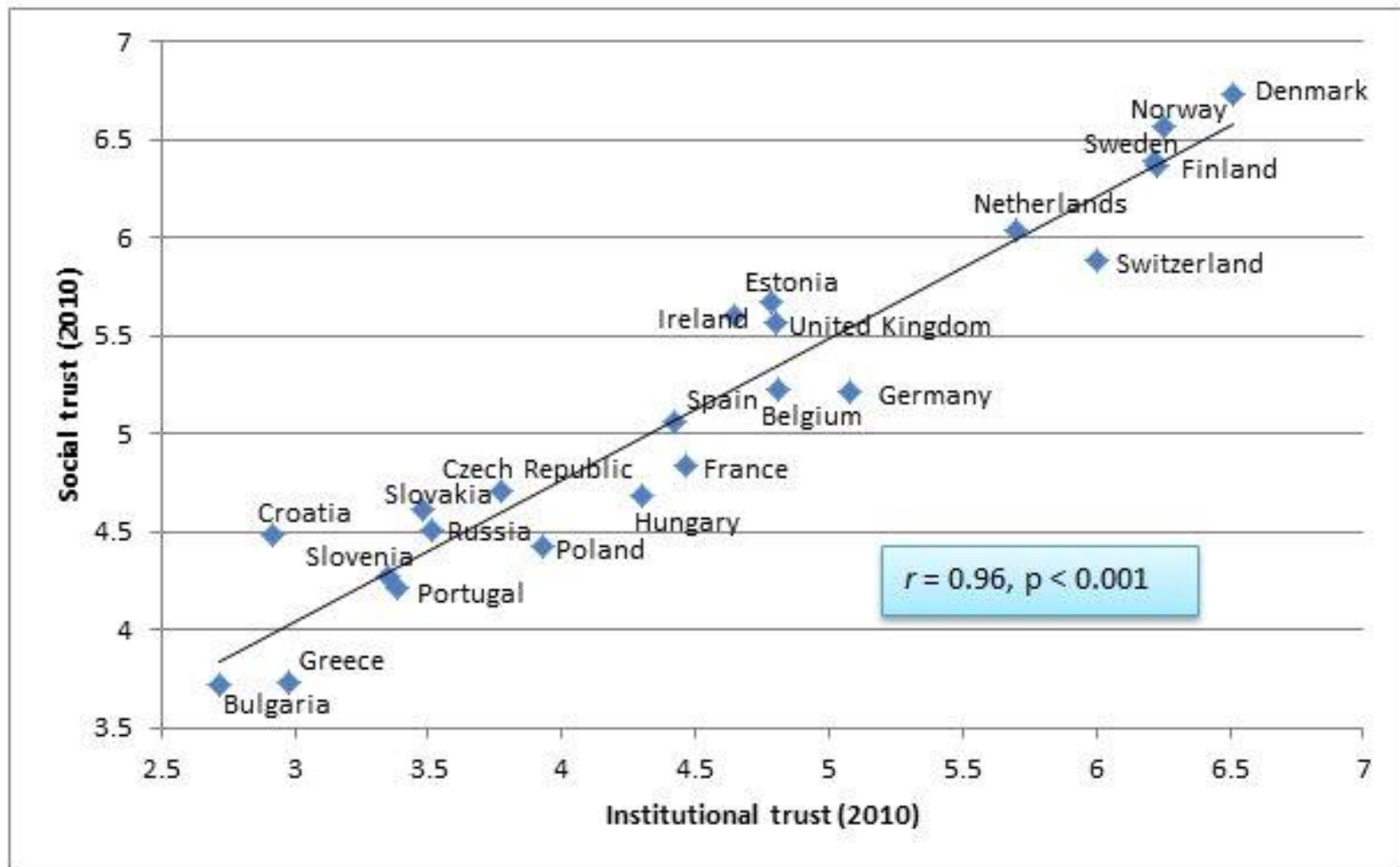
- Positive relation of trust and trustworthiness on firm productivity (Becchetti and Pace, 2006 and Fullenkamp and Chami, 2002)
- Lack of trust and trustworthiness prevents the development of economic relationships among individuals belonging to different ethnic groups and as such, it is one of the microeconomic causes of poor economic performance (see, among others, Alesina, Baqir and Easterly, 1999; Gradstein and Justman, 2002; Gradstein, 2003 and Montalvo and Reynal-Querol, 2005a and 2005b)
- Different forms of social capital are crucial to solve development problems through cooperation (Brown and Ashman, 1996, Becchetti and Conzo, 2010 and Becchetti, Castriota and Conzo, 2010)

Real Growth Rate 1980s and Trust in People Former and Current Communist Nations Excluded



- Interpersonal trust
- Generalized trust
- Institutional trust

Interpersonal and institutional trust (correlation)



Source: European Social Survey (2010)

Theoretical models for such non standard preferences:

- Fehr and Schmidt (1999): Inequity aversion
- Charness and Rabin (2002) agents maximising a combination of Rawls' maximin criterion and a utilitarian welfare function
- Andreoni (1989 and 1990) “impure altruism”: better to donate directly than obtaining the same result by paying taxes.
- Fehr and Schmidt (2000), a person is altruistic if the first partial derivatives of $U(x_1, \dots, x_N)$ with regard to x_1, \dots, x_N are strictly positive

“The most fundamental failure of game theory is its lack of a theory of **when and how rational agents share mental constructs**. The assumption that humans are rational is an excellent first approximation. (...) Humans have a social epistemology, meaning that we have reasoning processes that afford us forms of knowledge and understanding, especially the understanding and sharing of the content of other minds, that are unavailable to merely “rational” creatures. This social epistemology characterizes our species. The bounds of reason are thus not the irrational, but the social”

(Herbert Gintis, 2009, p. xvi).

Examples of non standard preferences

Procedural utility

Frey and Stutzer (2002); Frey, Benze and Stutzer, (2003) define procedural utility as **“the well-being people gain from living and acting under institutionalized processes as they contribute to a positive sense of self, addressing innate needs of autonomy, relatedness and competence.”**

In such case non exclusive care for one's own payoff does not depend on other regarding preferences but on the modalities which led to the final outcome.

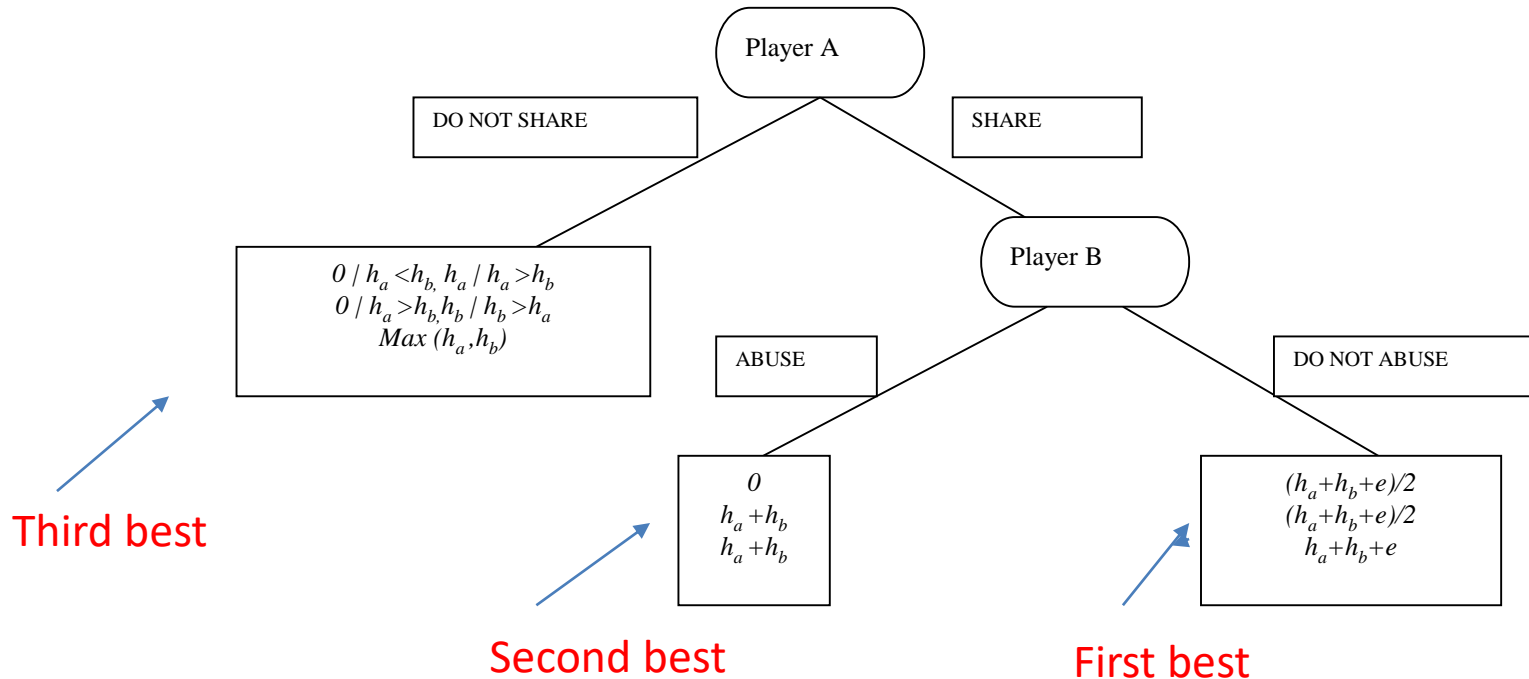
Is there a trust paradox ?

“Più forte è il legame della fiducia, più una società può progredire; più essa progredisce, più i suoi membri diventano razionali e quindi più strumentali nel rappresentarsi tra loro. Più strumentali essi sono, meno diventano capaci di dare e ricevere fiducia. Così lo sviluppo della società erode il legame che la rende possibile e di cui ha continuamente bisogno”

(M. Hollis 1998)

Firms are “trust game corporations”

(Becchetti-Pace-Gianfreda (2009))



- Production depends on team work where workers with different non overlapping skills play trust games....
-low quality of relations create paralysis of trust and suboptimal results
- The Nash equilibrium is the “third best” !

Proof: When $h_a > h_b$, player A payoff is h_a if he does not share and 0 if he decides to share but player B abuses, as he will do when $h_a + h_b > (h_a + h_b + e)/2$, or, $e < h_a + h_b$ (abuse condition). Hence, if $h_a > h_b$ ¹⁰ and $e < h_a + h_b$, the non-sharing solution is the SPNE of the unipерiodal full information game. The SPNE yields a firm output - $Max(h_a, h_b)$ - which is lower than the one achievable under cooperation ($h_a + h_b + e$), and even lower than the “second best” output obtainable under the share, abuse pair of strategies $(h_a + h_b)$.¹¹ [Q.E.D.]

A definition of relational goods (1)

Relational goods “depend upon interactions among persons” (Ulhaner 1989, p.253) and are peculiar intangible outputs of an affective and communicative nature (Gui 2000) that are produced through social interactions.

Examples of relational goods are: social approval, solidarity, friendship and its benefit, the desire to be recognized or accepted by others, but also the ““atmosphere” that is created among waiting customers in a hair dresser’s shop, or a conversation concerning non-professional matters occurring during breaks in a business meeting” Gui (2000, p. 152).

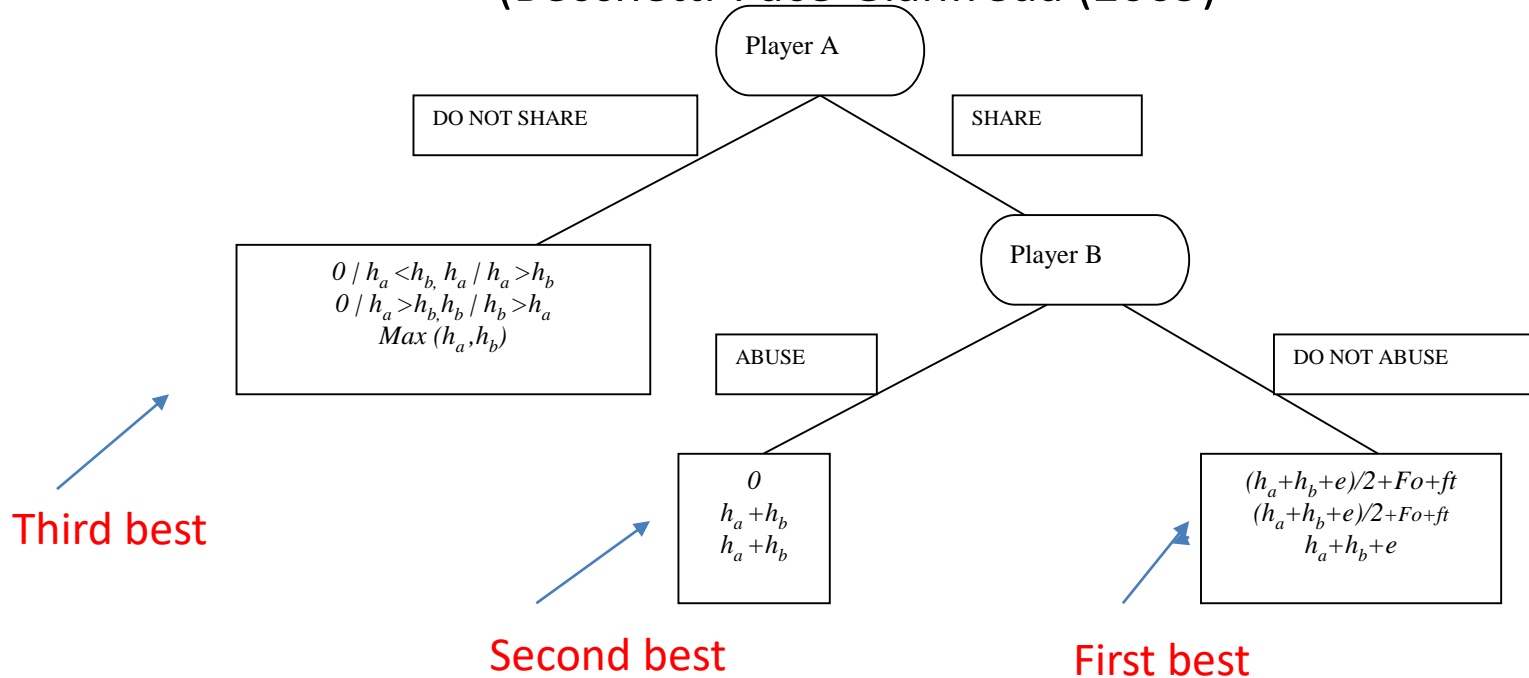
Relational goods are local public goods (non rival and non exclusive but only with regard to the people who participate in their production).

The value of relational goods depend on beliefs and dispositions toward participants to their production

Gratuity and quality of previous relations increase their value (Bruni 2005)

The “trust game corporations” with relational goods

(Becchetti-Pace-Gianfreda (2009))



- Production depends on team work where workers with different non overlapping skills play trust games....
-low quality of relations create paralysis of trust and suboptimal results
- The Nash equilibrium is the “third best” !

The game with relational goods

Proposition 5. Given the following three rules of the law of motion of relational goods:

a) $F_t = F_0 + f_t | (s, na)$ SPNE of the game in t ;

b) $F_t = F_0 | (ns, a)$ SPNE of the game in t and

c) $F_t = 0 | (s, a)$ SPNE of the game in t ,

where F_0 is the stock of relational goods at time 0.

(s, na) is a stationary equilibrium of the game if: ia) $e > (h_a + h_b)/2 - (F_0 + f_t)$ and ib) $f_t > (h_a - h_b - e)/2$ when $h_a > h_b$ or $h_a = h_b$; ii) if $e > (h_a + h_b)/2 - (F_0 + f_t)$ when $h_a < h_b$. Conversely, if $e < (h_a + h_b)/2 - (F_0 + f_t)$, (ns, a) is a stationary equilibrium of the game.

Investigating the law of motion of social capital....

- The association between trust and sociodemographic controls: what is the causality nexus ?
- Social capital needs to be studied statically and non dynamically
- What are the factors affecting its law of motion?
- How do they work in a low income environment in which social capital is at its scarcest levels?

Source: Joseph Henrich, Robert Boyd, Samuel Bowles, Colin Camerer, Ernst Fehr, Herbert Gintis, Richard McElreath, Michael Alvard, Abigail Barr, Jean Ensminger, Natalie Smith Henrich, Kim Hill, Francisco Gil-White, Michael Gurven, Frank W. Marlowe, John Q. Patton and David Tracer (2005), 'Economic Man' in cross-cultural perspective: Behavioral experiments in 15 small-scale societies



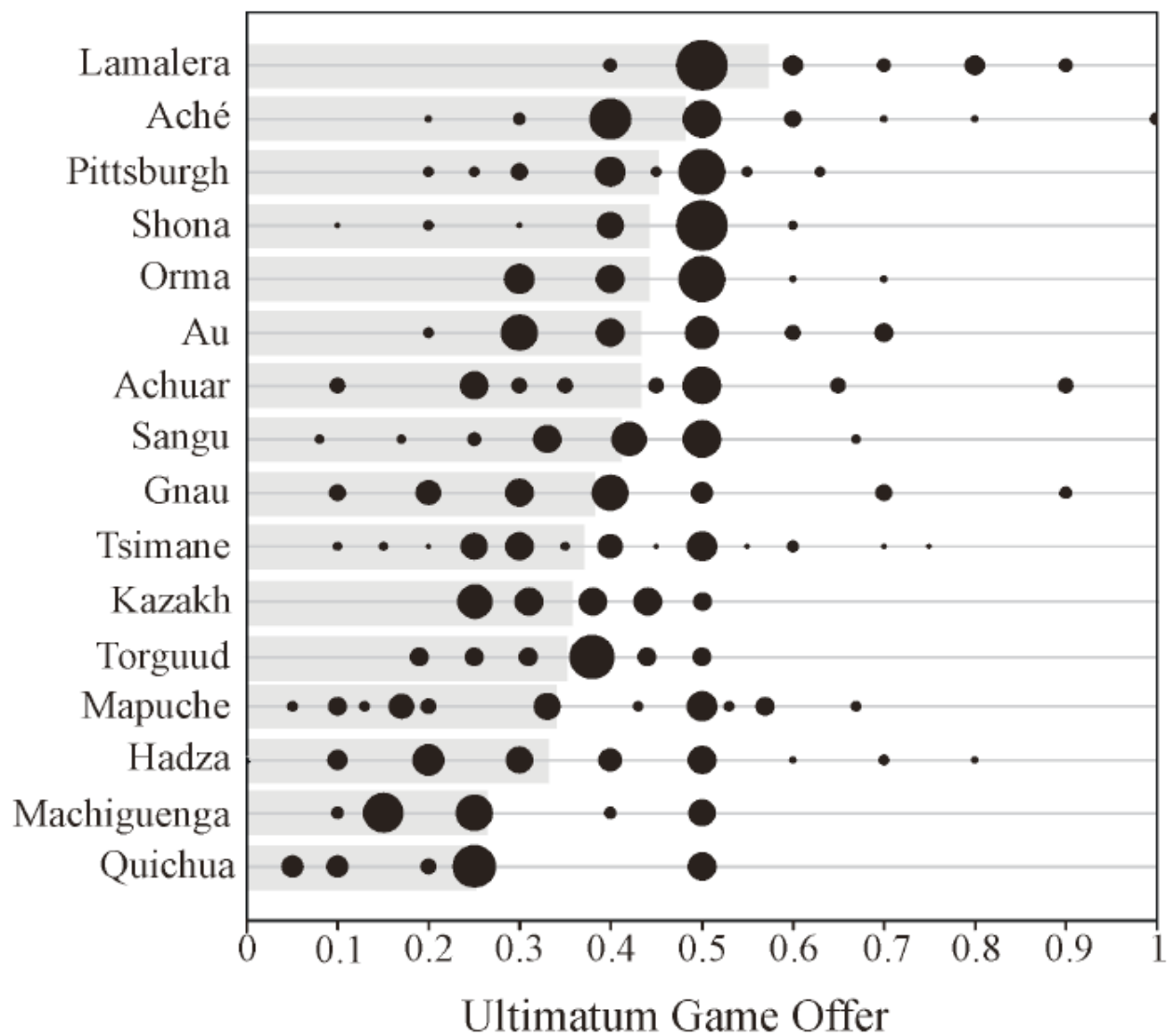
Figure 1. Locations of small-scale societies



Orma,
Kenya



Au, New Guinea





Creditworthiness as a signal of trustworthiness

Becchetti L., Conzo P., 2011,, in «Journal of Public Economics», vol. 95, n. 3-4, pp. 265-27

INTRODUCTION - MOTIVATION (1)

- MFI generates “vertical trust”.
- What about “horizontal trust”?
 - Loan concession implies that the borrowers passed the screen of the MFI and of the groupmates...
 - It therefore becomes a signal of trustworthiness for the borrower’s business partners
 - If business activity has the trust game characteristics - i.e. sequential structure such that one of the two parties has to take the initiative first by sharing something (knowledge, physical or financial assets) -
→ higher trustworthiness affects positively the borrower’s payoff
 - As a consequence loan concession increases the borrower’s repayment capacity
 - And if all this is true we identify one causal relationship between the MFI loan and borrower’s performance which overcomes the selection bias problem of impact studies

INTRODUCTION - MOTIVATION (2)

- Guinname (2005): quality of incentives and sanctions make a successful program
- But incentives:
 - Peer pressure (Banerjee, Besley and Guinnane, 1994)
 - Progressive loan and social sanctions (Wydick, 1999; Karlan, 2005a)
- ...can generate, among others
 - free riding when groups become large (Besley and Coate 1995)
 - borrowers' run when groupmates are unable to repay (Bond and Rai, 2006)

INTRODUCTION – MOTIVATION (3)

- Our point: MFI borrowers are trustworthy *not just because of incentives*.
 - MFI trustees give more even in the anonymous investment game experiment where no individual penalty or social blame is posed on lack of trustworthiness... (even though incentive mechanisms may have helped to select more trustworthy borrowers).
- Karlan (2005b): borrowers' trustworthiness is a good predictor of financial performance and success of group lending.
 - The author concludes by saying that his data "*do not show whether trustworthiness can be created*"
- Our paper: **loan concession by the MFI creates trustworthiness!**
 - MFI membership → **signals** trustworthiness → triggers trust (from MFI/non-MFI individuals) toward the borrower.

INTRODUCTION – MOTIVATION (4)

- **Methodology:** *field experiment Buenos Aires' suburbs*
 - MFI borrowers (treatment) and eligible non-MFI (control) play an **INVESTMENT GAME**.
 - Information set: counterpart's MFI status.
- **Main findings:**
 - Trustors: all types **give more to (expect more from)** MFI than to non-MFI trustees;
 - Trustees:
 - if MFI, **pay back significantly more** than non-MFI trustees;
 - **expect more** from trustors who know they are playing with an MFI trustee (*I order beliefs*)
 - believe that trustors believe that they **will give more** if they are MFI trustees (*II order beliefs*).

INTRODUCTION – MOTIVATION (5)

- Two potential problems:
 1. Endogeneity and reverse causality:
 - credit triggers trustworthiness through signaling...
 - ...no matter whether trustworthiness *preexists* before or is created after the loan concession.

INTRODUCTION – MOTIVATION (6)

2. Just framing?

- ...if present, why MFI trustees send back more independently of the trustor's MFI/non-MFI status?
- ...even if present, still policy results! Economic agents should **exploit the framing** effect and **signal their MFI status** to make their business relationship more successful.

THEORETICAL FRAMEWORK (1)

- *Trustee: A and B-types differ on trustworthiness*
- *Trustor:*
 - $p_A > p_B, p \in [0, 1]$
 - p = trustee's payback share
 - q = guess that the trustee is of A-type \rightarrow depends on s
 - $s = [0, 1]$ signal affecting that guess $\rightarrow = 1$ when trustee gets the loan
 - $q(s): q(1) > q(0). \quad q \in [0, 1]$ and $s = 0, 1$
 - *Trustor's belief and contribution: $TrB'(q) > 0 ; TrC'(q) > 0$.*
- *Trustees' beliefs:*
 - $FOB'(q(.)) > 0$ – trustees believe trustors give more when they know that their counterpart is an MFI
 - $SOB'(q(.)) > 0$ – trustees believe trustors think that trustees will give when MFI.

THEORETICAL FRAMEWORK (2)

a)	Trustor contribution	$H_{01}: \text{TrC}(q(1)) = \text{TrC}(q(0))$	vs.	$H_{A1}: \text{TrC}(q(1)) > \text{TrC}(q(0))$
b)	Trustor belief	$H_{02}: \text{TrB}(q(1)) = \text{TrB}(q(0))$	vs.	$H_{A2}: \text{TrB}(q(1)) > \text{TrB}(q(0))$
c)	Trustee contribution	$H_{03}: \text{TeC}_{\text{MFI}} = \text{TeC}_{\text{NON-MFI}}$	vs.	$H_{A3}: \text{TeC}_{\text{MFI}} > \text{TeC}_{\text{NON-MFI}}$
d)	Trustee I order belief	$H_{04}: \text{FOB}(q(1)) = \text{FOB}(q(0))$	vs.	$H_{A4}: \text{FOB}(q(1)) > \text{FOB}(q(0))$
f)	Trustee II order belief	$H_{05}: \text{SOB}(q(1)) = \text{SOB}(q(0))$	vs.	$H_{A5}: \text{SOB}(q(1)) > \text{SOB}(q(0))$

- If all the nulls are rejected, and if business relationships take the form of investment games, MFI loan provision

- ✓ *allows the borrower to receive more trust from business partners*
- ✓ *generate higher payoffs.*
- ✓ *generates a positive indirect effect on the probability of borrower's success*

THE MFI: *PROTAGONIZAR* (1)

- > 3,000 uncollateralised loans in 6 years of life – *mainly group-lending*
- Located in the area of San Miguel (II belt of Gran Buenos Aires, Argentina)
- Agencies in the three “villas” (densely populated sub-urban areas) of *Santa Brigida, Barrio Mitre* and *Villa de Mayo*.

THE MFI: *PROTAGONIZAR* (2)

- **Eligibility** criteria (group lending):
 - MINIMUM SIX MONTH ENTERPRISE EXPERIENCE
 - NO DIRECT RELATIVES
 - LIVE AT A MAXIMUM OF 3 BLOCKS OF DISTANCE FROM EACH OTHER
 - DIFFERENT BUSINESS ACTIVITIES (ONLY ONE STREET VENDOR PER GROUP IS ALLOWED).

LOAN CONDITIONS

STANDARD OF LIVING (3)

- Interviewed individuals live on with roughly 12.29 PPP US\$ per day
- Poverty threshold with official inflation data is 5.43 PPP-US\$
- However official inflation is considered to be grossly undervalued (Rigobon, 2009)
 - Ecolatina: prices rose 65% from Dec. 1, 2006, to July 31, 2009, vs. the 20% increase according to the statistics institute (Indec).
- Administrative costs 5% monthly against 50% avg. interest rate charged by moneylenders

THE EXPERIMENT DESIGN (1)

- From the 3 villas (in equal proportion):
 - Treatment group: 152 borrowers → split into “veteran” and “new” according to credit seniority (median credit-cycle = 17)
 - Control group: 152 eligible non-participants
- Eligibility reduces selection bias ...
- ...although whether individuals were (or not) already trustworthy before joining *Protagonizar* does not alter the signaling effect

THE EXPERIMENT DESIGN (3)

- OUR APPROACH:
 - Players do not move simultaneously: *ex-ante* matching
→ both of them play twice, vs. an MFI and a non-MFI counterpart.
 - *Strategy method* for trustee
 - Direct questions to elicit I and II order trustee's beliefs
 - Motivations of the choices of both players.
- Experiment + survey on socio-demographic characteristics

THE EXPERIMENT DESIGN (4)

- Selected individuals → randomly divided into 152 trustors and 152 trustees (each plays twice).
- The round order is randomly alternated.
- Anonymity - only info on counterpart's MFI/non-MFI status (and seniority).
- *Ex ante* matching:

TRUSTOR	MFI TRUSTEE	NON-MFI TRUSTEE
76 MFI (38 <i>New</i> + 38 <i>Veterans</i>)	19 <i>Veterans</i> 19 <i>New</i>	38
76 Non-MFI	19 <i>Veterans</i> 19 <i>New</i>	38

THE EXPERIMENT DESIGN (5)

- IMPLEMENTATION (1):
 - standardized instructions
 - endowment: 10 tokens = 25 pesos (*realized average payoff = 34.78 pesos, 35% of average weekly installment, maximum potential payoff 85 pesos*).
 - each player knows that she will receive the payment according to her payoff from only one of the two rounds (randomly chosen)
 - payment in 45 days from the interview.
 - players do not know the exact payoff at the end of each round (non-simultaneity).

THE EXPERIMENT DESIGN (6)

- IMPLEMENTATION (2):
 - player is informed - in each round - about the MFI/non-MFI status (and seniority) of her counterpart
 - in each round the player specifies how much to *send* (if trustor) or *return* (if trustee) to the counterpart.
 - strategy method for trustees: response strategy to any trustor's possible move (better to understand the trustee's overall strategy)

THE EXPERIMENT DESIGN (7)

- IMPLEMENTATION (3):
 - *I order beliefs*: ex-post surprise question → how much she believes the counterpart has actually *sent* (if trustee) or *returned* (if trustor).
 - *II order beliefs*: ex-post surprise question → ask trustee to guess counterpart's beliefs on her strategy.
 - Answers on beliefs are remunerated by an additional payoff of 5 tokens (10 pesos) in case of correct guess
 - At the end → select motivation among four alternatives.

DESCRIPTIVE FINDINGS (1)

Summary statistics of Socio-Demographic and Economic Variables					
Variable	Obs	Mean	Std. Dev.	Min	Max
Age	361	43.19114	12.74666	17	79
Household Income (pesos)	361	4096.097	4922.754	150	65000
Household Food expenditure (pesos)	361	38.85286	30.12302	6.666667	400
Total Productivity*	361	17.3678	22.59894	0	312.5
Job Experience (years)	350	8.340974	8.728824	0.6	50
Savings/month (pesos)	361	186.0295	525.4139	0	5000
N. of persons in the house	360	4247911	1920876	1	15
N.of children	361	2.99169	2.135009	0	13
Schooling years (Respondent)	359	8.477716	3.054131	1	18
Schooling years (Partner)	361	5.587258	4.503548	0	18
Credit cycle	361	6.614958	8.687712	0	26
Total amount of last microcredit received	209	1086.158	647.1381	150	3000
Amount of last repayment	209	108.3245	64.54202	11	354
Duration of the microcredit (weeks)	209	10.85167	3.185304	4	30

* Income from first and second activity per hour worked
 17/12/2019 Leonardo Becchetti & Pierluigi Conzo
 - University of Rome "Tor Vergata"

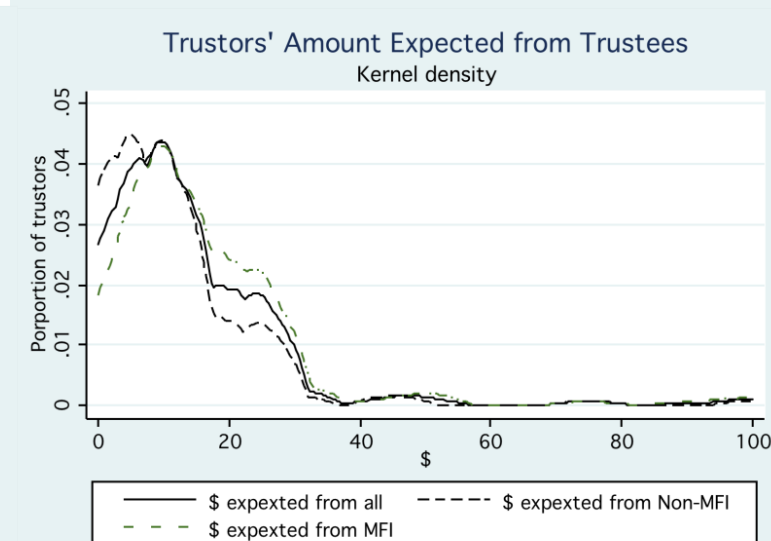
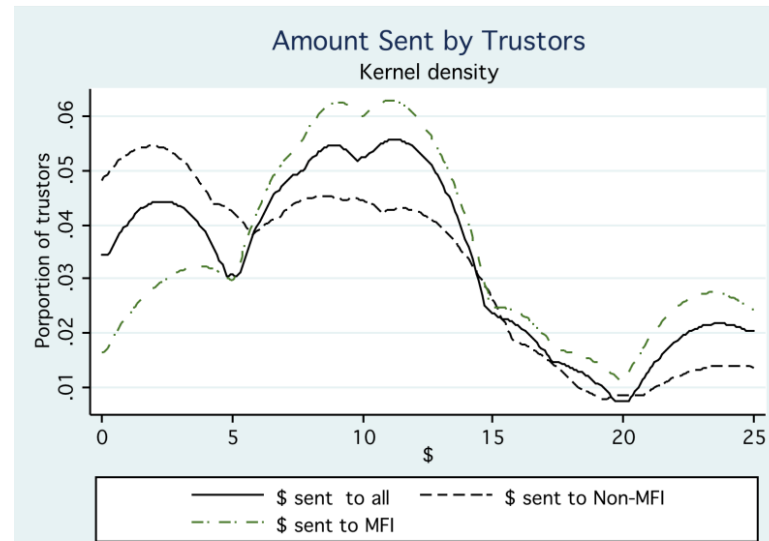
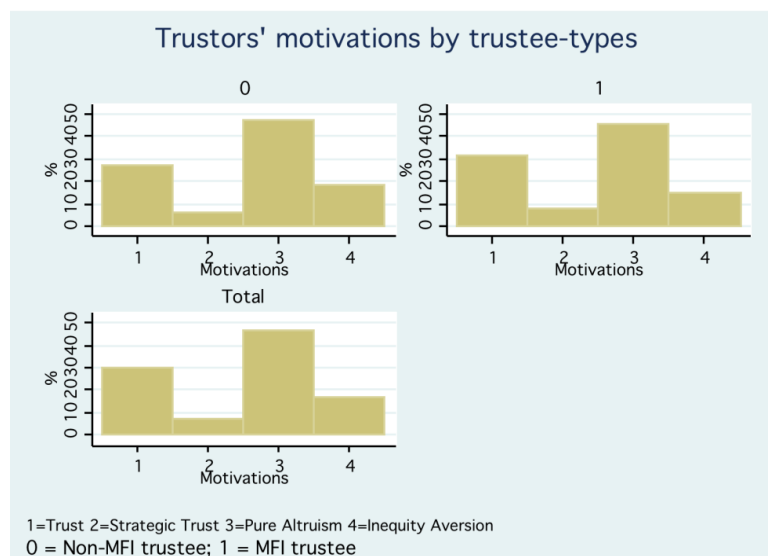
DESCRIPTIVE FINDINGS (2)

Descriptive statistics for MFI borrowers and eligible non participants										
	Eligible non participant					Clients				
Variable	Obs	Mean	Std. Err.	[95% Conf. Interval]		Obs	Mean	Std. Err.	[95% Conf. Interval]	
Age	152	43.68421	1.104722	41.5015	45.86692	150	42.53333	0.9579838	40.64034	44.42632
Household Income	152	3662.599	462.1428	2749.497	4575.7	150	4982.687	387.5127	4216.956	5748.417
Household Food expenditure	152	42.29793	3.249835	35.87691	48.71895	150	35.89159	1.725943	32.4811	39.30207
Total Productivity	152	15.79351	2.223757	11.39981	20.18721	150	20.60705	1.636741	17.37283	23.84127
Job Experience (years)	152	7.447368	0.684113	6.095699	8.799038	147	9.390476	0.7362667	7.935359	10.84559
N. of temporary employess	152	0.0263158	0.0130265	.000578	.0520536	150	0.06	0.0254358	.0097385	.1102615
Savings/month	152	78.48684	25.43209	28.23815	128.7355	150	313.8444	57.65782	199.9118	427.7771
N. of persons in the house	150	4.013333	0.1608108	3.695569	4.331098	150	4.44	0.1529662	4.137737	4.742263
N.of children	152	2.519737	0.1600503	2.20351	2.835964	150	3.253333	0.169797	2.917812	3.588854
Schooling years (Resp.)	150	8.9	0.2614278	8.383415	9.416585	150	8.403333	0.2370445	7.93493	8.871736
Schooling years (Partner)	152	5.828947	0.3903659	5.057663	6.600232	150	5.28	0.3360675	4.615926	5.944074
Credit cycle						150	15.76	0.4911458	14.78949	16.73051
Total amount of last microcredit received						150	1209.513	52.15598	1106.452	1312.574
Amount of last repayment						150	121.1681	5.290582	110.7139	131.6224
Duration of the microcredit (weeks)						150	10.84	0.1938841	10.45688	11.22312

DESCRIPTIVE FINDINGS (3) - *TRUSTOR*

Trustor	Trustee		
	<i>Non-MFI</i>	<i>MFI</i>	Total
<i>Non-MFI</i>	8.83	11.70	10.26
	11.53	16.46	14.06
<i>MFI</i>	7.57	12.07	9.82
	10.65	15.87	13.41
Total	8.21	11.88	10.05
	11.10	16.16	13.74

The first number in the cell is the amount sent in pesos by trustors, whereas the second is the amount expected back from trustees.



DESCRIPTIVE FINDINGS (4) - *TRUSTOR*

Hypothesis testing on trustors' contribution and beliefs			
Test type	Avg. difference	z- stat	p-value
PARAMETRIC TESTS			
Within test on trustor contribution to an MFI vs. a non-MFI trustee (Hyp. H_{01})	3.76	4.64	(0.00)
Within test on trustor expectations from an MFI vs. a non-MFI trustee (Hyp. H_{02})	5.42	4.86	(0.00)
NON PARAMETRIC TESTS			
Wilcoxon rank-sum equality test on trustor's contribution to an MFI vs a non-MFI trustee (Hyp. H_{01})		-4.26	(0.00)
Wilcoxon rank-sum equality test on trustor's expectation from an MFI vs a non-MFI trustee (Hyp. H_{01})		-3.77	(0.00)

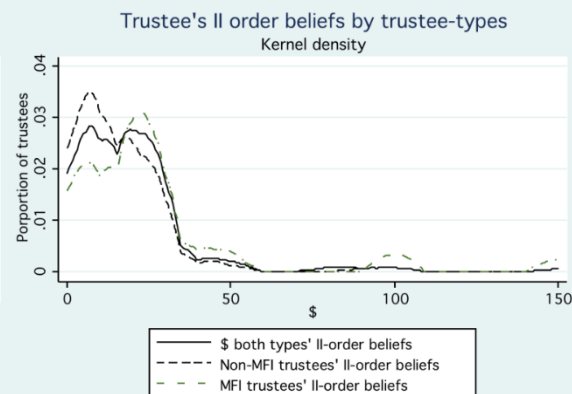
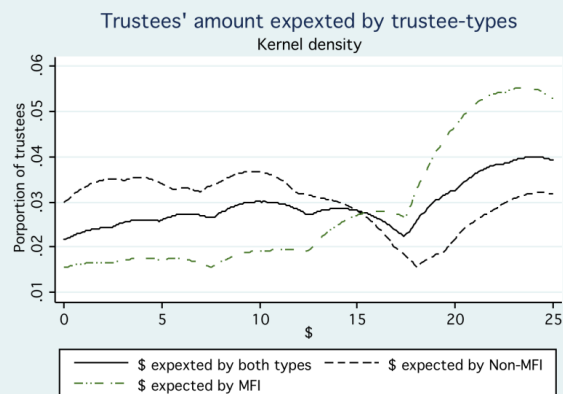
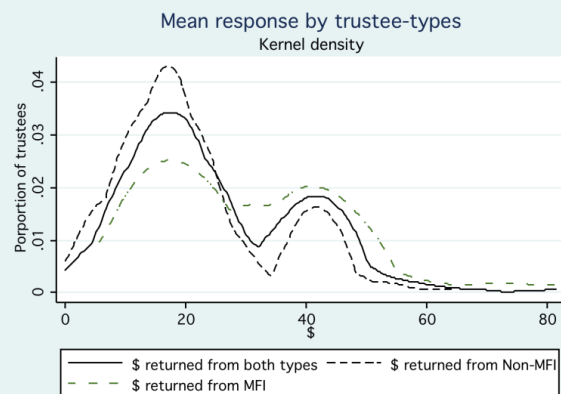
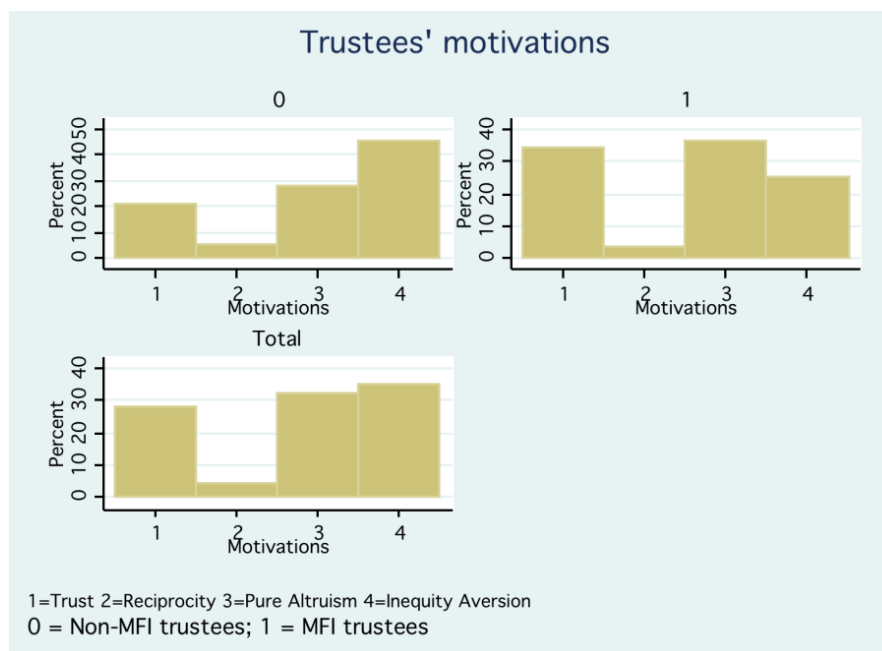
◉ WITHIN DIFFERENCE

- ◉ Significantly different from zero (rejection of the H_{01}) in amount sent and expected (rejection of the H_{02}).

DESCRIPTIVE FINDINGS (5) - *TRUSTEE*

Trustee	Trustor		
	<i>Non-MFI</i>	<i>MFI</i>	Total
<i>Non-MFI</i>	S	21.54	20.80
	I-B	11.46	13.53
	II-B	12.17	16.53
<i>MFI</i>	S	29.58	28.51
	I-B	17.15	18.47
	II-B	21.93	24.51

The first number in the cell is the trustee's response in pesos to trustors play, whereas the second and the third one represent the I and the II order beliefs respectively (in pesos)



DESCRIPTIVE FINDINGS (6) - *TRUSTEE*

Hypothesis testing on trustee's response, I and II order beliefs			
Test type	Avg. difference	z- stat	p-value
PARAMETRIC TESTS			
Within test on trustee's response to an MFI vs. a non-MFI trustor	-0.90	-1.48	(0.14)
Within test on trustee's I-order belief on an MFI vs. a non-MFI trustor move	1.81	1.64	(0.10)
Within test on trustee's II-order belief on an MFI vs. a non-MFI trustor move	3.56	1.32	(0.007)
NON PARAMETRIC TESTS			
Wilcoxon rank-sum equality test on trustee's response by MFI vs a non-MFI trustee (Hyp. H_{03})		-4.73	(0.00)
Wilcoxon rank-sum equality test on trustee's I order belief by MFI vs a non-MFI trustee (Hyp. H_{04})		-4.139	(0.00)
Wilcoxon rank-sum equality test on trustee's II order belief by MFI vs a non-MFI trustee (Hyp. H_{05})		-3.635	(0.0003)

- Trustees give more when MFI whatever the trustor type.
- Recall: *mean response* (strategy method)
- Trustees do not care about the trustor MFI/non-MFI characteristic in their choices and beliefs → no framing

Table 4.2 -Hypothesis testing on trustee's response, I and II order beliefs

Test type	Average difference	z- stat	p-value
PARAMETRIC TESTS			
<i>Within test on trustee's response to a MF vs. a non-MF trustor</i>	-0.90	-1.48	(0.14)
<i>Within test on trustee's I-order belief on a MF vs. a non-MF trustor move</i>	1.81	1.64	(0.10)
<i>Within test on trustee's II-order belief on a MF vs. a non-MF trustor move</i>	3.56	1.32	(0.007)
<i>t-test on trustee's response to a MF vs. a non-MF trustor</i>	.90	t = 0.54	Pr(T < t) = 0.70 Pr(T > t) = 0.585 Pr(T > t) = 0.29 Pr(T < t) = 0.10
<i>t-test on trustee's I-order belief on a MF vs. a non-MF trustor move</i>	-1.71	t = -1.25	Pr(T > t) = 0.210 Pr(T > t) = 0.90 Pr(T < t) = 0.07
<i>t-test on trustee's II-order belief on a MF vs. a non-MF trustor move</i>	-3.48	t = -1.43	Pr(T > t) = 0.1520 Pr(T > t) = 0.92 Pr(T < t) = 0.00
<i>t-test on trustee's response by MF vs. a non-MF trustee (Hyp. H₀₃)</i>	-7.87	t = -4.94	Pr(T > t) = 0.000 Pr(T > t) = 1.0000
<i>t-test on trustee's I-order belief by MF vs. a non-MF trustee (Hyp. H₀₃)</i>	-5.32	t = -3.99	Pr(T < t) = 0.00 Pr(T > t) = 0.0001 Pr(T > t) = 1.00
<i>t-test on trustee's II-order belief by MF vs. a non-MF trustee (Hyp. H₀₃)</i>	-8.89	t = -3.74	Pr(T < t) = 0.0001 Pr(T > t) = 0.0002 Pr(T > t) = 0.99
NON PARAMETRIC TESTS			
<i>Wilcoxon rank-sum equality test on trustee's response to a MF vs a non-MF trustor</i>		0.676	(0.4988)
<i>Wilcoxon rank-sum equality test on trustee's I order belief to a MF vs a non-MF trustor</i>		-2.222	(0.0263)
<i>Wilcoxon rank-sum equality test on trustee's II order belief to a MF vs a non-MF trustor</i>		-2.612	(0.0090)
<i>Wilcoxon rank-sum equality test on trustee's response by MF vs a non-MF trustee (Hyp. H₀₃)</i>		-4.73	(0.00)
<i>Wilcoxon rank-sum equality test on trustee's I order belief by MF vs a non-MF trustee (Hyp. H₀₄)</i>		-4.139	(0.00)
<i>Wilcoxon rank-sum equality test on trustee's II order belief by MF vs a non-MF trustee (Hyp. H₀₅)</i>		-3.635	(0.0003)

ECONOMETRIC FINDINGS (7) - *TRUSTOR*

$$1) \text{TrustorSend}_i = \beta_0 + \beta_1 HIncome_i + \beta_2 HComponents_i + \beta_3 Village_i + \beta_4 Age_i + \beta_5 Sex_i + \beta_6 CivilStatus_i + \beta_7 JobExp_i + \beta_8 Schooling_i + \varepsilon_i$$

$$2) \text{TrustorSend}_i = \beta_0 + \beta_1 HIncome_i + \beta_2 HComponents_i + \beta_3 Village_i + \beta_4 Age_i + \beta_5 Sex_i + \beta_6 CivilStatus_i + \beta_7 JobExp_i + \beta_8 Schooling_i + \beta_9 TrustorType_i + \beta_{10} TrusteeType_i + \varepsilon_i$$

$$3) \text{TrustorExpect}_i = \beta_0 + \beta_1 HIncome_i + \beta_2 HComponents_i + \beta_3 Village_i + \beta_4 Age_i + \beta_5 Sex_i + \beta_6 CivilStatus_i + \beta_7 JobExp_i + \beta_8 Schooling_i + \varepsilon_i$$

$$4) \text{TrustorExpect}_i = \beta_0 + \beta_1 HIncome_i + \beta_2 HComponents_i + \beta_3 Village_i + \beta_4 Age_i + \beta_5 Sex_i + \beta_6 CivilStatus_i + \beta_7 JobExp_i + \beta_8 Schooling_i + \beta_9 TrustorType_i + \beta_{10} TrusteeType_i + \varepsilon_i$$

- Trustors give around 3.67 pesos more (around 33% increase with respect the average contribution to a non-MFI trustee)
- Trustors expect their higher donation to MFI trustees will pay! (they expect on avg 5.5 more)
- The result is robust in trustor's type sample splits

Dep var: <i>TrustorSend</i>	<i>Whole sample</i>		<i>Non –MFI Trustors</i>	<i>MFI Trustors</i>
	<i>1</i>	<i>2</i>	<i>2a</i>	<i>2b</i>
Age	0.0449	0.0444	0.0202	0.0705
	(0.0514)	(0.0520)	(0.0647)	(0.0789)
Female	-0.596	-0.535	0.556	-1.771
	(1.207)	(1.233)	(1.518)	(2.115)
Single	-0.640	-0.626	1.106	-2.883
	(2.065)	(2.078)	(3.550)	(2.617)
Married	-1.878	-1.883	0.938	-4.403*
	(1.699)	(1.709)	(2.689)	(2.442)
Cohabitant	-1.219	-1.222	0.292	-2.542
	(1.904)	(1.914)	(2.851)	(2.603)
JobExp	0.0123	0.0147	0.0752	-0.0853
	(0.0631)	(0.0643)	(0.0898)	(0.0996)
Villa de Mayo	0.886	0.653	0.859	
	(1.526)	(1.647)	(1.789)	
S. Brigida	1.479	1.476	1.672	1.338
	(1.253)	(1.254)	(2.005)	(1.947)
Schooling	-0.0673	-0.0676	-0.206	-0.0122
	(0.191)	(0.192)	(0.272)	(0.274)
HIncome	-0.000143*	-0.000140*	-0.000114	-0.000101
	(8.15e-05)	(8.22e-05)	(0.000196)	(9.91e-05)
HComponents	0.517	0.507	0.852*	0.185
	(0.331)	(0.337)	(0.454)	(0.527)
TrustorType		-0.351		
		(1.230)		
TrusteeType		3.670***	2.862***	4.500***
		(0.705)	(1.053)	(0.969)
<i>Observations</i>	Leonardo Becchetti & Pierluigi Conzo - University of Rome "Tor Vergata"		152	148
<i>R-squared</i>	0.032	0.087	0.092	0.146

Dep. Var.: <i>TrustorExpect</i>	<i>Whole sample</i>		<i>Non –MFI Trustors</i>	<i>MFI Trustors</i>
	<i>3</i>	<i>4</i>	<i>4a</i>	<i>4b</i>
Age	0.0190	0.0181	0.0754	-0.0632
	(0.0960)	(0.0935)	(0.0972)	(0.201)
Female	-1.339	-1.533	1.820	-4.835
	(2.731)	(2.968)	(2.673)	(5.762)
Single	2.629	2.667	6.782	-2.931
	(5.753)	(5.777)	(6.540)	(7.966)
Married	-2.854	-2.927	2.922	-8.857
	(3.651)	(3.626)	(3.870)	(6.246)
Cohabitant	-3.296	-3.311	2.050	-8.994
	(4.479)	(4.466)	(3.631)	(8.122)
JobExp	0.0590	0.0505	0.200*	-0.174
	(0.0835)	(0.0860)	(0.115)	(0.137)
Villa de Mayo	3.824	4.359	4.824	
	(3.291)	(3.431)	(3.572)	
S. Brigida	3.298	3.285	4.658	1.957
	(2.262)	(2.255)	(3.020)	(2.691)
Schooling	-0.233	-0.239	-0.462	-0.241
	(0.406)	(0.408)	(0.455)	(0.822)
HIncome	-0.000258**	-0.000257*	-3.87e-05	-0.000210
	(0.000122)	(0.000130)	(0.000301)	(0.000133)
HComponents	0.740	0.779	1.511	0.0784
	(0.686)	(0.688)	(1.035)	(0.882)
TrustorType		0.575		
		(2.377)		
TrusteeType		5.144***	4.955**	5.569***
		(1.213)	(1.997)	(1.403)
<i>Observations</i>	Leonardo Becchetti & Pierluigi Conzo 278 - University of Rome "Tor Vergata"		140	138
<i>R-squared</i>	0.039	0.069	0.123	0.100

ECONOMETRIC FINDINGS (8) - *TRUSTEE*

$$5) \quad TrusteeRESP_i = \beta_0 + \beta_1 HIncome_i + \beta_2 HComponents_i + \beta_3 Village_i + \beta_4 Age_i + \beta_5 Sex_i + \beta_6 CivilStatus_i + \beta_7 JobExp_i + \beta_8 Schooling_i + \varepsilon_i$$

$$6) \quad TrusteeRESP_i = \beta_0 + \beta_1 HIncome_i + \beta_2 HComponents_i + \beta_3 Village_i + \beta_4 Age_i + \beta_5 Sex_i + \beta_6 CivilStatus_i + \beta_7 JobExp_i + \beta_8 Schooling_i + \beta_9 TrustorType_i + \beta_{10} TrusteeType_i + \varepsilon_i$$

$$7) \quad Belief(I)_i = \beta_0 + \beta_1 HIncome_i + \beta_2 HComponents_i + \beta_3 Village_i + \beta_4 Age_i + \beta_5 Sex_i + \beta_6 CivilStatus_i + \beta_7 JobExp_i + \beta_8 Schooling_i + \beta_9 TrustorType_i + \beta_{10} TrusteeType_i + \varepsilon_i$$

$$8) \quad Belief(II)_i = \beta_0 + \beta_1 HIncome_i + \beta_2 HComponents_i + \beta_3 Village_i + \beta_4 Age_i + \beta_5 Sex_i + \beta_6 CivilStatus_i + \beta_7 JobExp_i + \beta_8 Schooling_i + \beta_9 TrustorType_i + \beta_{10} TrusteeType_i + \varepsilon_i$$

- Mean trustee response higher if the trustee is an MFI borrower (52 percent increase with respect to non-MFI trusteeavg.contr. [*trustor's type is not significant; females give significantly more*]).
 - FOBs: trustees believe that trustors would give significantly more when they know that they are MFI.
 - SOBs. Trustees believe that trustors believe that they will give more if they are MFI trustees.

Dep. Var.: <i>TrusteeRESP</i>	<i>Whole sample</i>		<i>Non –MFI Trustors</i>	<i>MFI Trustors</i>
	<i>5</i>	<i>6</i>	<i>6a</i>	<i>6b</i>
Age	0.0437	0.0422	0.0639	0.0206
	(0.104)	(0.104)	(0.112)	(0.107)
Female	5.975***	4.967**	5.012**	4.923**
	(2.170)	(2.079)	(2.307)	(2.176)
Single	1.280	1.663	1.728	1.598
	(4.232)	(4.194)	(4.482)	(4.400)
Married	3.450	4.050	3.982	4.117
	(3.757)	(3.700)	(3.973)	(3.904)
Cohabitant	1.232	0.580	1.920	-0.759
	(4.224)	(4.125)	(4.492)	(4.344)
JobExp	-0.0759	-0.135	-0.159	-0.112
	(0.139)	(0.140)	(0.149)	(0.141)
Villa de Mayo	-7.744**	-2.371	-4.913	0.171
	(3.643)	(3.949)	(4.334)	(4.118)
S. Brigida	-1.277	0.297	0.923	-0.329
	(2.543)	(2.490)	(2.636)	(2.578)
Schooling	0.282	0.250	0.277	0.222
	(0.353)	(0.336)	(0.383)	(0.330)
HIncome	-0.000257**	-0.000296***	-0.000272***	-0.000320***
	(0.000106)	(0.0000994)	(0.000103)	(0.000112)
HComponents	0.676	0.327	0.498	0.156
	(0.720)	(0.735)	(0.772)	(0.751)
TrustorType		-0.903		
		(0.601)		
TrusteeType		7.501***	6.756***	8.246***
		(2.295)	(2.442)	(2.382)
<i>Observations</i>	304	304	152	152
<i>R-squared</i>	0.087	0.142	0.141	0.153

Dep. Var.: <i>Belief(I)</i>	<i>Whole sample</i>		<i>Non –MFI Trustors</i>	<i>MFI Trustors</i>
	<i>7</i>	<i>7a</i>	<i>7b</i>	<i>7c</i>
Age	-0.0550	-0.0551	0.0123	-0.122
	(0.0806)	(0.0809)	(0.0886)	(0.0903)
Female	-0.861	-1.632	-2.027	-1.247
	(1.615)	(1.432)	(1.489)	(2.015)
Single	-0.791	-0.676	-1.726	0.373
	(2.914)	(2.872)	(2.952)	(3.602)
Married	0.272	0.703	-1.934	3.331
	(2.552)	(2.599)	(2.382)	(3.893)
Cohabitant	-0.877	-1.303	-1.556	-1.051
	(2.679)	(2.676)	(2.876)	(3.193)
JobExp	0.0458	0.00252	0.0804	-0.0757
	(0.113)	(0.116)	(0.0995)	(0.186)
Villa de Mayo	-2.730	1.353	4.819	-2.110
	(2.340)	(2.437)	(2.981)	(3.503)
S. Brigida	-2.341	-1.064	-0.117	-2.017
	(1.802)	(1.645)	(1.557)	(2.371)
Schooling	0.0146	-0.00630	0.236	-0.248
	(0.268)	(0.253)	(0.247)	(0.352)
HIncome	1.00e-04	7.05e-05	0.000142*	-1.56e-06
	(6.85e-05)	(5.97e-05)	(7.62e-05)	(0.000123)
HComponents	0.145	-0.114	0.496	-0.724
	(0.395)	(0.439)	(0.327)	(0.743)
TrustorType		1.695		
		(1.140)		
TrusteeType		5.626***	5.423***	5.838**
		(1.735)	(1.550)	(2.663)
Observations	299	299	149	150
R-squared	0.019	0.069	0.147	0.076

Dep. Var.: <i>Belief(II)</i>	<i>Whole sample</i>		<i>Non –MFI Trustors</i>	<i>MFI Trustors</i>
	δ	δa	δb	δc
Age	-0.138	-0.141	-0.193	-0.0865
	(0.146)	(0.144)	(0.158)	(0.167)
Female	-1.942	-3.192	-1.332	-5.087
	(3.447)	(3.273)	(3.366)	(3.782)
Single	-7.296	-7.948	-8.474	-7.370
	(5.024)	(5.019)	(5.263)	(5.843)
Married	-2.538	-2.018	-3.634	-0.433
	(4.559)	(4.390)	(4.680)	(4.790)
Cohabitant	-0.492	-1.063	-6.225	4.111
	(7.006)	(6.773)	(6.851)	(7.933)
JobExp	0.200	0.119	0.0188	0.222
	(0.230)	(0.235)	(0.200)	(0.344)
Villa de Mayo	-5.895*	1.015	2.684	-0.593
	(3.450)	(3.826)	(5.280)	(4.432)
S. Brigida	0.00511	1.768	0.156	3.376
	(3.375)	(3.552)	(4.095)	(3.692)
Schooling	0.182	0.0714	0.0368	0.121
	(0.414)	(0.427)	(0.469)	(0.519)
HIncome	8.57e-05	5.54e-05	0.000139	-2.65e-05
	(0.000103)	(0.000142)	(0.000103)	(0.000220)
HComponents	-0.00783	-0.541	-0.198	-0.831
	(0.585)	(0.687)	(0.701)	(0.842)
TrustorType		3.442***		
		(1.301)		
TrusteeType		9.388**	8.654**	10.21**
			(4.167)	(3.987)
<i>Observations</i>	Leonardo Becchetti & Pierluigi Conzo University of Rome "Tor Vergata"		140	138
<i>R-squared</i>	0.032	0.081	0.060	0.122

Causality: mfi-trustworthiness

- HORIZONTAL TRUSTWORTHINESS EXTERNALITIES → whatever the causal link between trustworthiness and the loan ?
- *Without causality the signaling effect does not work only if the potential business partners have full information on the borrower*
- However, check (robustness) with IV → instrument = DISTANCE from MFI:
 - Relevant: performs poorly at S-Y checks; however Anderson-Rubin test → reject the null that the coefficient is zero at 3%.
 - Exogenous: does not affect directly trustworthiness (same monitoring for all) but the decision of becoming MFI borrower (remember the 3 quadras requirement: being closer to Protagonizar raises the probability of being included in a group)

Instrumented Var.: <i>TrusteeType</i>	
TrusteeType	33.73*
	(19.03)
Age	0.0371
	(0.112)
Female	1.443
	(3.601)
Single	3.002
	(4.385)
Married	6.146*
	(3.715)
Cohabitant	-1.700
	(4.245)
JobExp	-0.343
	(0.210)
Villa de Mayo	16.42
	(13.93)
S. Brigida	5.803
	(4.677)
Schooling	0.136
	(0.328)
	-
HIncome	0.000432*
	(0.000236)
HComponents	-0.895
	(1.124)
TrustorType	-0.903
	(2.032)
<i>Observations</i>	<i>304</i>
<i>R-squared</i>	<i>-0.518</i>

Exogeneity Test	
<i>Chi-Square</i>	<i>1.771</i>
<i>P-Value</i>	<i>0.183</i>
Test of Excluded Instruments (Weak Ident.)	
<i>F-Stat.</i>	<i>3.704</i>
Weak-Instrument-Robust Inference (A.&R.)	
<i>Chi-Square</i>	<i>2,775</i>
<i>P-Value</i>	<i>0.0958</i>

CONCLUSIONS – IMPLICATIONS (1)

- For the CAUSAL RELATIONSHIP
 - *FROM* LOAN CONCESSION *TO* BORR. PERFORMANCE
- ...WE IDENTIFY (causal order)
 - MFI loan concession →
 - signal of trustworthiness →
 - positive effects on economic activity →
 - capacity of the borrower to repay the loan

CONCLUSIONS – IMPLICATIONS (2)

- Consequences on impact studies:
 - if the trust game experiment gives our results...
 - The correlation between loan concession and the performance in impact studies *must contain* the **causal relationship** above-mentioned
 - other direct or reverse causality patterns, or third omitted factors may be in but →
 - we have **at least one causal relationship** documenting that **microfinance matters**.

THE GLUE OF THE ECONOMIC SYSTEM: THE EFFECT OF RELATIONAL GOODS ON TRUST AND TRUSTWORTHINESS

L Becchetti, GD Antoni, M Faillo, L Mittone
Rationality and Society 23 (4), 403-426

Global warming but...also “local freezing”

- In Milan in the last 5 years the number of singles living families has risen by 20 percent and now one out of two families has a single component... (ISTAT 2007)
- Half of them are above 65 and many of them are young professionals
- Poverty risk and depression are higher among singles and the “relational” emergence may have effects not only on life satisfaction but also on economic prosperity ?

The glue of the economic system: the effect of relational goods on trust and trustworthiness

Abstract

- The role of “relational goods” is almost unexplored in the literature, yet our experimental results document that, even in their weakest form (opportunity of meeting an unknown player at the end of an experimental game), they significantly affect important “lubricants” of economic activity such as trust and trustworthiness and generate significant departures from the Nash equilibrium outcome in trust (investment) games.
- Our findings suggest that relational goods are an important “source of energy” in economic interactions and that the study of this “neglected particle” of socioeconomic life may produce significant advancements on both positive and normative economics.

Progress in economics as a discovery of new “particles”

STEPS

1. *homines economici*, or self-interested individuals maximising their utility functions in a perfect information framework.
2. imperfect and asymmetric information. Set of incentives studied to align conflicting interests of different economic agents in order to avoid problems such as moral hazard and adverse selection.
3. Contracts are incomplete. Trust and trustworthiness are two fundamental virtues that grease “economic devices” by fostering fruitful transaction among agents even in all cases in which abusers cannot be monitored and sanctioned.
4. Behavioral economics models: agents with more sophisticated motivational structures.

The motivation for our experiment

The “energy” of social interactions is a neglected factor affecting “lubricants” of economic life such as trust

The study of the interaction between a specific form of social interaction (“relational goods”) and socioeconomic behaviour is still at its infancy but is essential to explain paradoxes of current models and shed light on actual socioeconomic behaviour.

A definition of relational goods (1)

Relational goods “depend upon interactions among persons” (Ulhaner 1989, p.253) and are peculiar intangible outputs of an affective and communicative nature (Gui 2000) that are produced through social interactions.

Examples of relational goods are: social approval, solidarity, friendship and its benefit, the desire to be recognized or accepted by others, but also the ““atmosphere” that is created among waiting customers in a hair dresser’s shop, or a conversation concerning non-professional matters occurring during breaks in a business meeting” Gui (2000, p. 152).

Relational goods are local public goods (non rival and non exclusive but only with regard to the people who participate in their production).

The value of relational goods depend on beliefs and dispositions toward participants to their production

Gratuity and quality of previous relations increase their value (Bruni 2005)

The rationale of our experiment

- Possibility to consume relational goods through a personal interaction that agents will share after having played an investment game in which we give agents the possibility to declare if they want to meet the other player or if they do not.
- By playing the investment game, the agents have the possibility to affect, inside an economic transaction, the reciprocal beliefs and dispositions on the counterparts.
- We test whether the propensity to be trustful and to cooperate with unknown agents in an economic context (the investment game) is significantly increased by the possibility to produce and consume relational goods through a personal interaction after the conclusion of the economic transaction.
- Both the players (the Trustor and the Trustee) have the possibility to affect the pre-conditions of the encounter through their decisions within the game.

The rationale of our experiment (2)

- The **Trustor** can affect the beliefs and the disposition that the Trustee has towards him by showing himself trustful. A trustful contribution by the Trustor reveals the willingness to create a cooperative relation with the Trustee and creates positive conditions for the production of relational goods after the game.
- On the social and economic point of view such contribution entails a monetary risk for the Trustor which may be traded off by nonmaterial benefits generated by the relational good consumed during the encounter.
- The **Trustee** can affect the beliefs and the disposition of the Trustor by showing himself trustworthy (i.e. by sending back to the Trustor a “fair” amount). The trade-off between giving away monetary benefits to “pay” non material gains applies also to him.

An important caveat

The concept of relational good may vary from a **minimal** to a **maximum content**.

The **minimal content** is just the desire to avoid the hostility of the counterpart

The **maximum content** may be the hope to build a friendship with the other player starting from the small joint experience lived during the game.

We just observe in the experiment whether contributions grows when the opportunity of the encounter is provided (and/or is chosen by the two players) but we cannot discriminate whether the players do it by having in mind the minimal or the maximum content of the relational good.

Links with the experimental and behavioral economics literature

Even if experimental results on

- Ultimatum games (Güth, Schmittberger and Schwarze, 1982, Camerer and Thaler 1995),
- Dictator Games (Andreoni and Miller 2002),
- Gift Exchange Games (Fehr, Kirchsteiger and Reidl, 1993; Fehr, et al. 1998).
- Trust Games (Berg, Dickhaut and McCabe 1995; Ben-Ner e Putterman 2006).
- Public Goods Games (Fischbacher, Gächter and Fehr 2001; Sonnemans, Schram and Offerman 1999; Fehr and Gächter 2000)

have widely stressed that human behaviour is also strongly motivated by the consideration of others (i.e., for example, by fairness, reciprocity and inequity aversion), we are not aware of previous experimental studies that introduce the possibility of consuming relational goods in order to analyse their impact on cooperation.

Links with the experimental and behavioral economics literature (2)

Our work differs also from studies devoted to the analysis of the effect of pre-play communication – and more in general on the manipulation of the social distance between the players - on individual choice in the some of the games mentioned above (for example: Isaac an Walker, 1991; Ledyard, 1995; Frey and Bohet, 1999; Charness and Gneezy, 2000; Buchan, Croson and Johnson, 2006)

In our study subjects can decide to remove the anonymity, but they will meet their counterparts only at the end of the game and only if also their counterparts have decided to meet them. If a subject decide not to meet his/her counterpart, he/she will play a standard anonymous game. This implies that the decision about the meeting is part of player's strategy.

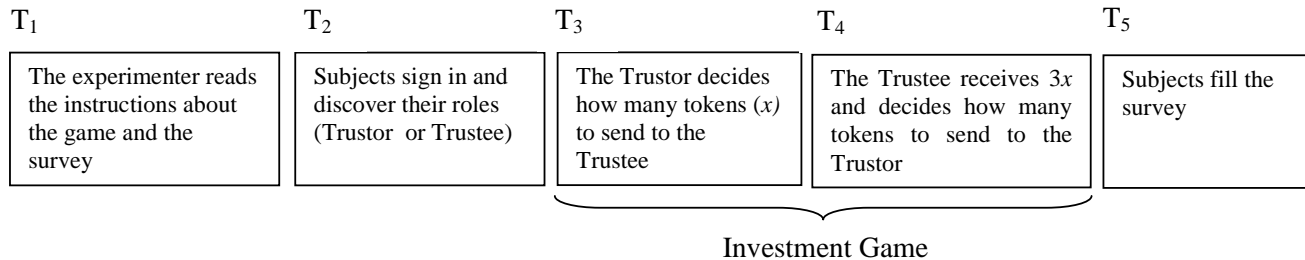
..the decision to meet is in itself a “relational good”

Summary of our treatments

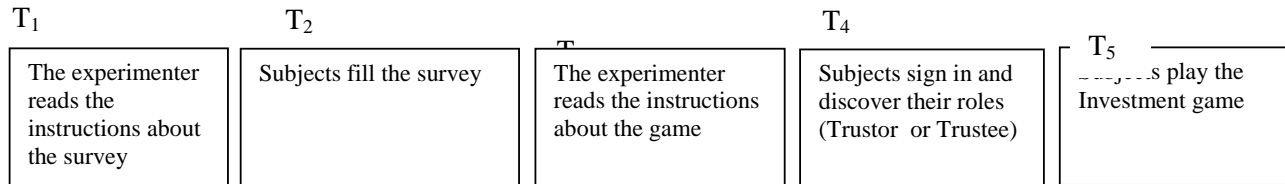
- Baseline treatment in Trento (TB)
- Meeting Treatment in Trento with survey beforehand (T1B)
- Meeting Treatment in Trento with survey afterwards (T1A)
- Baseline treatment in Milano with survey beforehand (MBB)
- Baseline treatment in Milano with survey afterwards (MBA)
- Meeting Treatment in Milano with survey beforehand (M1B)
- Meeting Treatment in Milano with survey afterwards (M1A)

APPENDIX 1. Timing of the experiment

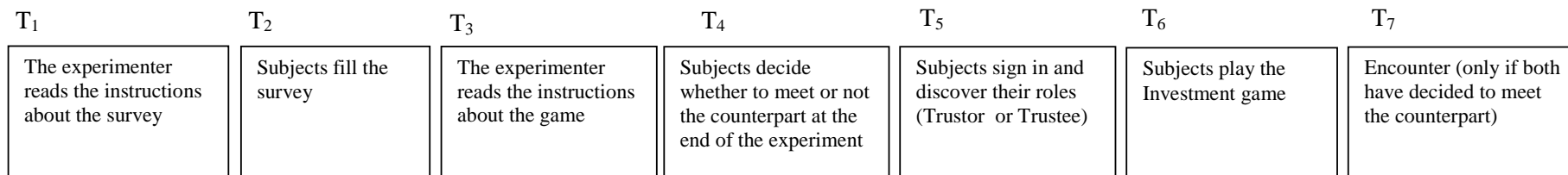
TREATMENTS TB AND MBA (Baseline Trento and Baseline Milano, with survey beforehand)



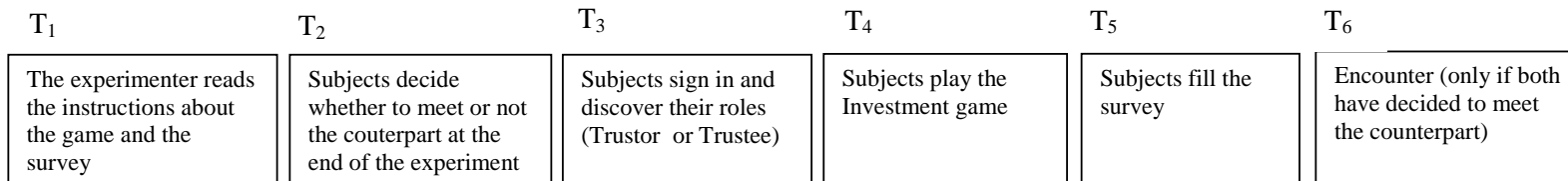
TREATMENT MBB (Baseline Milano with survey afterwards)



TREATMENTS T1B AND M1B (Encounter, Trento and Milano, with survey beforehand)



TREATMENTS T1A AND M1A (Encounter, Trento and Milano, with survey afterwards)



Experimental treatments

Trento	
Survey beforehand	Survey afterwards
No Encounter	TB (64 subjects)
Encounter	T1B (32 subjects)

Milano	
Survey beforehand	Survey afterwards
No Encounter	MBB (32 subjects)
Encounter	M1B (32 subjects)

A more analytical explanation of our experiment

Trustor utility function

$$U_S = \alpha_s (10 - X_s + X_R^e) + \beta_s RG^e(X_s, X_R^e) + \sum_i \delta_{si} \Omega_i$$

Standard monetary since payoff	Relational good payoff	Other non standard arguments (altruism, etc.)
-----------------------------------	---------------------------	--

$$X_R = \lambda 3X_s, X_s \in [0,10] \text{ and } \lambda \in [0,1]$$

$$E_s[X_R] = E_s[\lambda_0 + \theta \lambda^*] 3X_s$$

$$E[\lambda^*] > 0 \mid \sigma_R^e = a$$

“strategic effect” the trustee may give
more because she decided to opt for the
encounter

we may rewrite

$$U_S = \alpha_s \{10 + \{3E_s[\lambda_0 + \theta \lambda^*] - 1\}X_s\} + \beta_s RG^e(X_s, X_R^e) + \sum_i \delta_{si} \Omega_i$$

When Nash rationality is common knowledge, $\delta_{Si} = 0$ $\beta_S = 0$ and $E_S[X_R] = 0$, we necessarily get $X_R = 0$.

The Trustor can depart from Nash behavior (give more than zero) also when she is self-interested and Nash Rational but expect the trustee is not. This is the case when $\lambda^e > 1/3$

The opposite case is the one in which a Trustor is not purely interested in monetary payoffs and decides however to give zero when

$$\beta_S RG(X=0) < 0$$

Hypotheses on trustor behaviour

i) the marginal utility of trustor's contribution when the option of the encounter is not available (ONA case) is

$$\left. \frac{\partial U_s}{\partial X_s} \right|_{ONA} = \alpha_s (3E_s \lambda_o - 1) + Z$$

Where Z is the value of the sum of the derivatives of the additional Ω non standard arguments in the utility function

Hypotheses on trustor behaviour (2)

ii) the marginal utility of trustor's contribution when he does not opt for the encounter and the option of the encounter is available (OA/NO case) is

$$\left. \frac{\partial U_s}{\partial X_s} \right|_{OA/NO} = \alpha_s \{3E_s[\lambda_o + \theta \lambda^*] - 1\} + Z$$

Hypothesis 1

strategic effect on the Trustor from the opportunity of the encounter :

the trustor will give more under ii) than under i) if $\vartheta > 0$ and

$$\left. \frac{\partial U_s}{\partial X_s} \right|_{OA/NO} > 0$$

Consider now

iii) the marginal utility of the trustor's contribution when he does opt for the encounter (OA/O case)

$$\left. \frac{\partial U_s}{\partial X_s} \right|_{OA/O} = \alpha_s \{3E_s[\lambda_o + \theta\lambda^*] - 1\} + \frac{\partial \beta_s RG^e(X_s, X_R^e)}{\partial X_s} + Z$$

Hypothesis 2:

relational effect on the Trustor from the opportunity of the encounter

the trustor will give more under iii) than under ii) if

$$\left. \frac{\partial U_s}{\partial X_s} \right|_{OA/NO} > 0 \quad \text{and} \quad \frac{\partial \beta_s RG^e(X_s, X_R^e)}{\partial X_s} > 0$$

which implies that both $\beta_s > 0$ and $\frac{\partial RG^e(X_s, X_R^e)}{\partial X_s} > 0$

The test on trustors' contribution when he opts or does not for the encounter

From the above described analytical framework it is clear that in our experiment, by comparing contributions of trustors when they opt and do not opt for the encounter, we test two joint hypotheses:

- i) $\beta=0$,
- ii) RG is a positive function of XS

Or

- i) the individual has a positive taste for relational good,
- ii) the relational good is a positive function of the individual contribution since a cooperative attitude creates better conditions for the encounter or increases the value of the relational good enjoyed in the encounter

The test on trustors' contribution when the encounter is available and she does not opt or when the encounter is not available

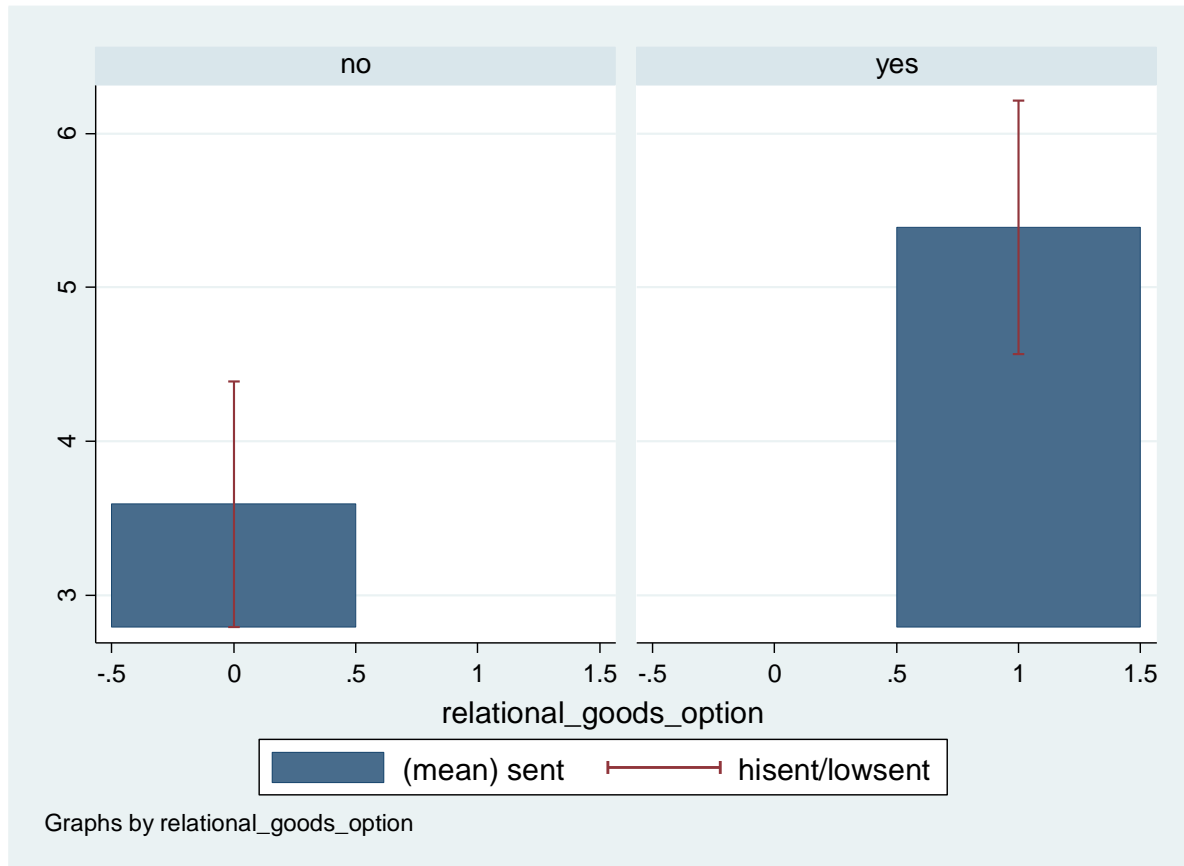
Since the trustor utility function is

$$U_s = \alpha_s \{10 + \{3E_s[\lambda_o + \theta\lambda^*] - 1\}X_s\} + \beta_s RG^e(X_s, X_R^e) + \sum_i \delta_{si} \Omega_i$$

If the trustor gives more in the first case he does it only if $\theta=0$ (the value of the relational good is zero in both cases and all the rest does not change)

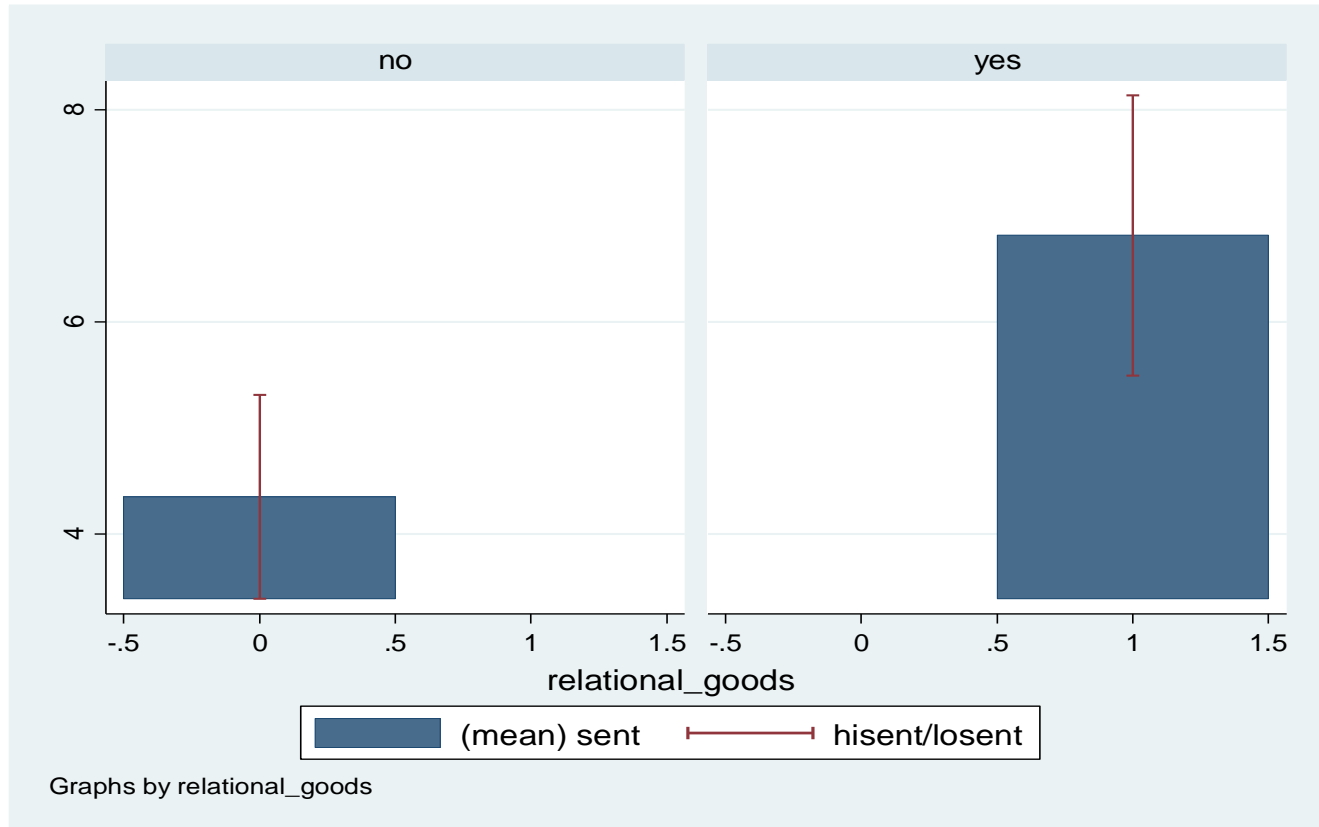
Note that, by considering the two tests, if we compare the trustor contribution when the option of the encounter is not available and when it is available and he opts we cannot disentangle the “strategic” from the “relational good” effect

Difference in the amount sent by the trustor when the option of the encounter is available or not



Two-sample Wilcoxon rank-sum (Mann-Whitney) test= -3.061 Prob > |z| = 0.0022

Difference in the amount sent between trustor who opted for the encounter and those who did not



Two-sample Wilcoxon rank-sum (Mann-Whitney) test $z = -2.853$ Prob $> |z| = 0.0043$

With the option of the encounter the share of NE consistent trustors falls dramatically

The share of trustors following a behaviour consistent with *standard “homo oeconomicus” preferences* (sending no money to the trustee) is

14.84 percent on the overall sample of 128 observations,

risers to 25 percent in the 64 cases in which the opportunity of the encounter is not available and

falls sharply to 4.65 percent in the same number of cases in which the opportunity is offered

Two distinct components

- 1) I increase contribution even if I do not opt for the encounter as I believe that the trustee could opt and send back more (**strategic motivation**)

(TEST: contribution when the opportunity is not available vs contribution when the opportunity is available but the trustor does not opt)

- 2) I increase contribution because I opt for the encounter and want to affect positively disposition of the partner (to increase the value of the relational good)

(TEST: contribution when the opportunity is available and the trustor opt for it vs contribution when the opportunity is available but the trustor does not opt)

The effect of the option of the encounter on the probability that the trustor follows Nash behaviour

Method	<i>Logit</i>	<i>Logit</i>
Relgoods	-1.990 (0.695)***	-3.079 (1.221)***
Male	-0.943 (0.596)	-1.948 (1.058)*
Nmembers	-0.701 (0.286)***	-0.969 (0.474)**
Income		0.012 (0.347)
Constant	2.978 (1.586)*	5.286 (2.829)*
Pseudo R2	0.178	0.315
Prob > chi2	0.001	0.003
Number of obs.	121	73

* significant at 10%; ** significant at 5%; ***

significant at 1%; Standard errors in brackets

Note: both in the case of “survey after the game” and in the case of “Trento sessions”, Rel_goods option predict failure (nash=0) perfectly

The determinants of the trustor's contribution

Method	<i>OLS</i>	<i>Ologit</i>	<i>OLS</i>	<i>Ologit</i>
Relgood	2.479 (0.755)***	1.625 (0.519)***	3.231 (0.948)***	2.396 (0.734)***
Sex	2.016 (0.749)***	1.256 (0.481)***	2.255 (0.898)**	1.442 (0.583)**
Nmembers	0.310 (0.329)	0.219 (0.198)	0.283 (0.445)	0.250 (0.294)
Income			-0.263 (0.284)	-0.247 (0.183)
Constant	2.128 (1.432)		3.083 (2.316)	
cut1		-1.351 (0.976)		-2.542 (1.754)
cut2		-0.072 (0.886)		-0.449 (1.520)
cut3		0.548 (0.891)		-0.030 (1.509)
cut4		0.938 (0.892)		0.156 (1.502)
cut5		1.818 (0.893)		1.171 (1.478)
cut6		2.626 (0.915)		2.041 (1.481)
cut7		2.912 (0.929)		2.446 (1.500)
cut8		3.015 (0.936)		2.592 (1.507)
cut9		3.349 (0.962)		2.885 (1.531)
cut10		3.469 (0.962)		3.035 (1.543)
Adj	0.241		0.249	
R-squared				
Pseudo		0.072		0.097
R2				
Root MSE	2.869		2.877	
Prob > F	0.000		0.005	
Prob >		0.000		0.002
chi2				
Number of	62	62	43	43
obs.				

* significant at 10%; ** significant at 5%; *** significant at 1%; Standard errors in brackets

Selection bias problem

- Our experiment is subject to a typical selection bias problem since the definition of the treatment and control sample is not random but determined by a decision of the subjects undergoing the experiment.
- It may well be therefore that the significantly higher contribution provided when opting for the encounter is not determined by the possibility of the encounter itself but by the ex ante characteristics which led individuals to choose this option.

How to correct for the selection bias: the treatment regression approach for the trustor

The model

$$Amountsent_i = \alpha_0 + \alpha_1 Male + \alpha_2 Nmembers + \alpha_3 Encounter + \varepsilon_i \quad (1.1)$$

$$Encounter_i = \beta_0 + \beta_1 Income + \beta_2 Parmarried + \beta_3 Numknown + v_i \quad (1.2)$$

where (v) and (ε) are bivariate normal random variables with zero mean and covariance matrix

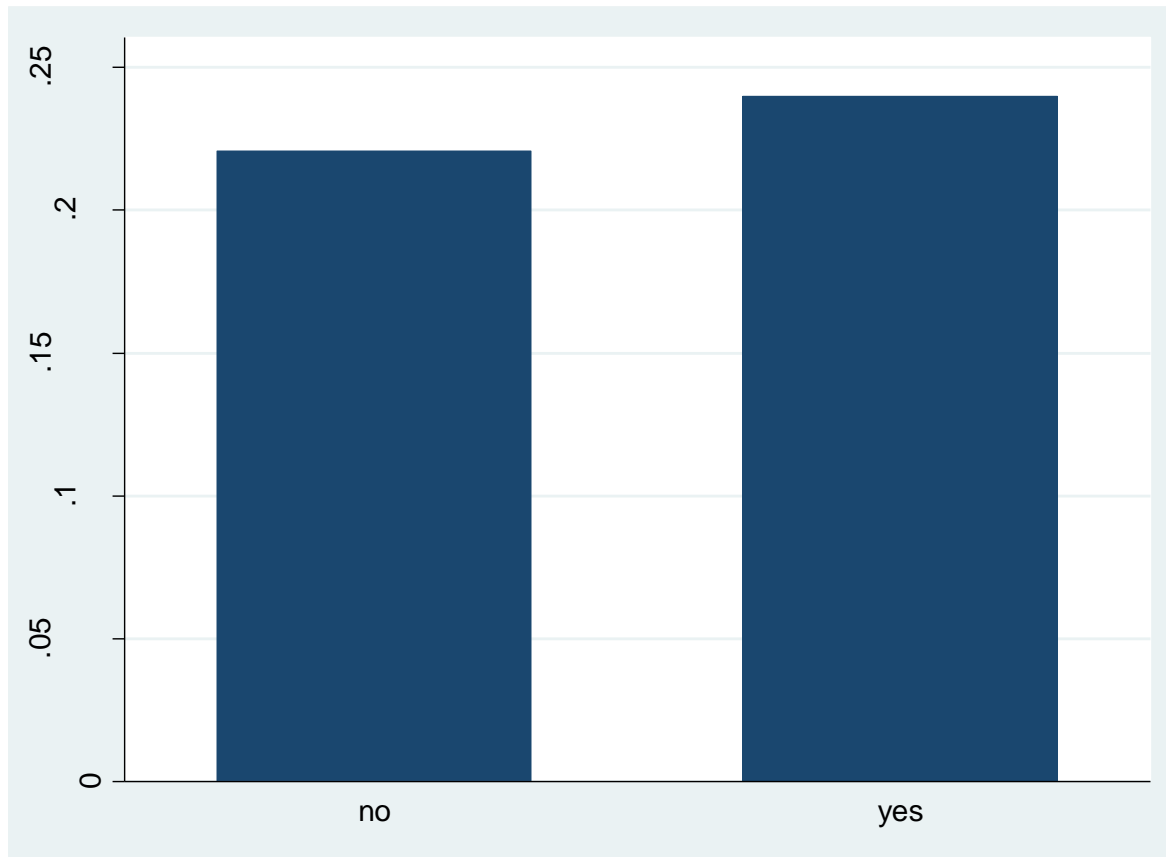
$$\begin{bmatrix} \sigma & \rho \\ \rho & 1 \end{bmatrix}$$

The likelihood function for the joint estimation of (1.1) and (1.2) is provided by Maddala (1983) and Greene (2003).

Results of the treatment regression approach for the trustor

Dep. Var.	Amount sent	Decision to meet the trustee	Amount sent	Decision to meet the trustee
Sex	2.137 (0.854)**		2.144 (0.846)**	
Nmembers	0.328 (0.460)		0.289 (0.458)	
Income		0.352 (0.145)**		0.399 (0.164)**
Parmarried		-1.512 (0.524)***		-1.698 (0.563)***
Numknown				0.031 (0.018)*
Decision to meet the trustee	2.781 (1.609)*		2.536 (1.498)*	
Constant	2.123 (2.374)	-0.355 (0.684)	2.397 (2.291)	-0.947 (0.812)
Number of obs.	43		43	
Log likelihood		-126.432		-124.763

Difference in the amount sent by the trustor when the option of the encounter is available or not



Two-sample Wilcoxon rank-sum (Mann-Whitney) test $z = -0.720$ Prob $> |z| = 0.4713$

The trustee's utility function

$$U_R = \alpha_R (10 + (1 - \lambda)3X_s) + \beta_R RG^e(X_R, X_S) + \sum_i \delta_{si} \Omega_i$$

Consider also that the trustee may abandon Nash behaviour when the encounter is available if

$$\alpha_R (10 + 3X_s) < \alpha_R (10 + (1 - \lambda)3X_s) + \beta_R RG^e(X_R, X_S)$$

Or

$$\alpha_R \lambda 3X < \beta_R RG^e(X_R, X_S)$$

that is, the monetary loss determined by the amount given back is more than compensated by the value of the encounter.

Hypothesis on trustee's behaviour

iv) The marginal utility of the trustee if the opportunity of the encounter is not available (ONA case):

$$\left. \frac{\partial U_R}{\partial X_R} \right|_{ONA} = -\alpha_R + Z$$

v) The marginal utility of the trustee if the opportunity of the encounter is available and she does not opt for it (OA/NO case):

$$\left. \frac{\partial U_R}{\partial X_R} \right|_{ONA} = -\alpha_R + Z$$

Hypothesis on trustee's behaviour (2)

vi) The marginal utility of the trustee if the opportunity of the encounter is available and she does opt for it (OA/O case):

$$\left. \frac{\partial U_R}{\partial X_R} \right|_{OA/O} = -\alpha_R + \frac{\partial \beta_s RG^e(X_s, X_R^e)}{\partial X_R} + Z$$

Hypothesis 3

Relational effect on the trustee from the opportunity of the encounter

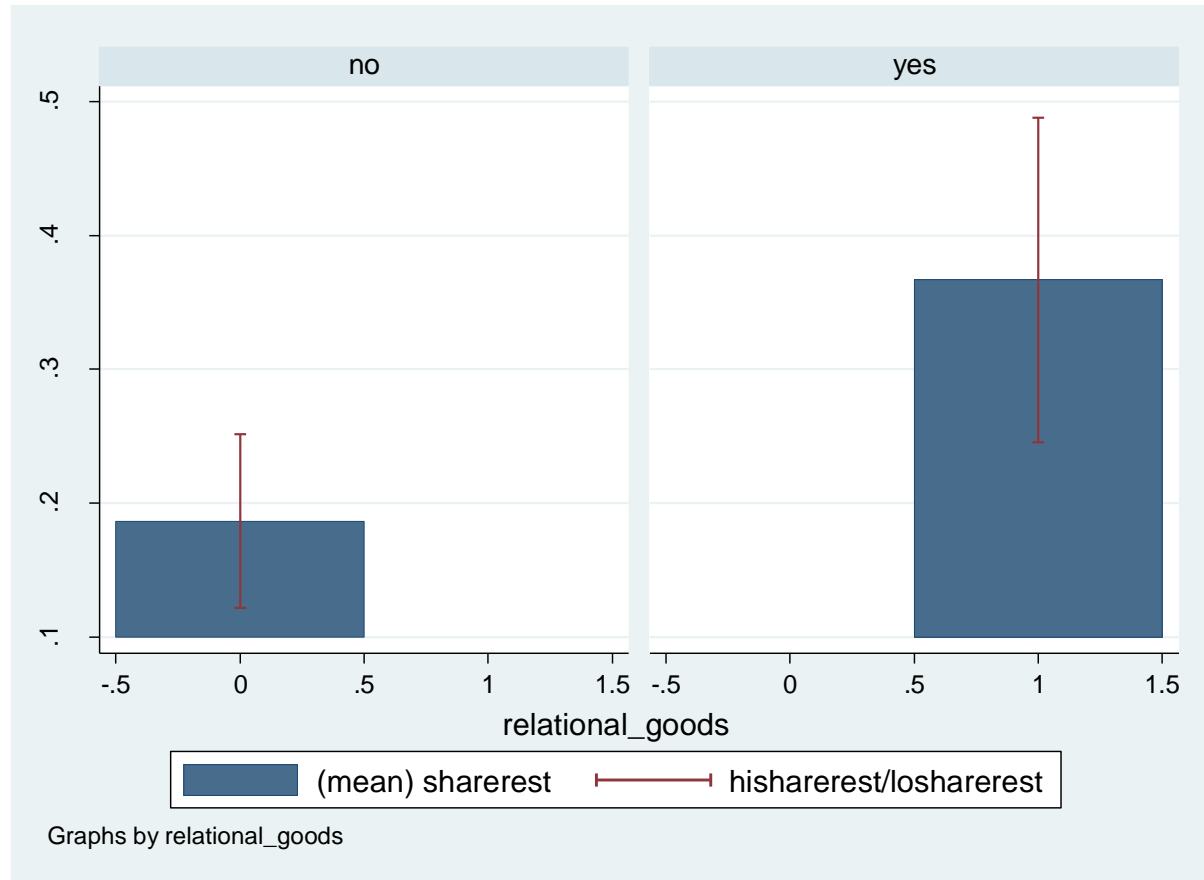
The trustee will give more under iii) than under ii) if

$$\left. \frac{\partial U_R}{\partial X_R} \right|_{ONA} > 0 \quad \text{and} \quad \frac{\partial \beta_R RG^e(X_s, X_R^e)}{\partial X_R} > 0$$

which implies that both $\beta_R > 0$ and $\frac{\partial RG^e(X_s, X_R^e)}{\partial X_R} > 0$

Note that the trustee may infer from such “high” contribution that there is a high probability that the trustor has opted for the encounter and therefore increase her own contribution for this reason

Difference in the amount sent between trustees who opted for the encounter and those who did not



Two-sample Wilcoxon rank-sum (Mann-Whitney) test $z = -2.701$ Prob $> |z| = 0.0069$

Determinants of the amount sent by the trustee

Method	<i>OLS</i>	<i>Tobit</i>	<i>OLS</i>	<i>Tobit</i>
Encounter	0.190 (0.064)***	0.246 (0.086)***	0.170 (0.079)**	0.235 (0.106)**
Male	0.005 (0.057)	-0.037 (0.079)	0.002 (0.073)	-0.032 (0.100)
Nmembers	0.033 (0.028)	0.034 (0.039)	0.058 (0.039)	0.069 (0.054)
Income			-0.003 (0.027)	-0.022 (0.038)
Constant	0.052 (0.123)	-0.010 (0.170)	-0.026 (0.172)	-0.066 (0.231)
Adj R-squared	0.129		0.249	
Pseudo R2		0.173		0.155
Root MSE	0.218		0.091	
Prob > F	0.013		0.091	
Prob > chi2		0.019		0.108
Number of obs.	60	60	47	47

* significant at 10%; ** significant at 5%; *** significant at 1%; Standard errors in brackets

How to correct for the selection bias: the treatment regression approach for the trustee

The model

$$Sharerest_i = \alpha_0 + \alpha_1 Male + \alpha_2 Nmembers + \alpha_3 Encounter + \varepsilon_i \quad (2.1)$$

$$Encounter_i = \beta_0 + \beta_1 Selfint + \beta_2 Sport + \beta_3 Gencon + \beta_4 Year + v_i \quad (2.2)$$

where (v) and (ε) are bivariate normal random variables with zero mean and covariance matrix

$$\begin{bmatrix} \sigma & \rho \\ \rho & 1 \end{bmatrix}$$

The likelihood function for the joint estimation of (2.1) and (2.2) is provided by Maddala (1983) and Greene (2003).

Results of the treatment regression approach for the trustee

Dep. Var.	Sharerest	Decision to meet the trustee
Male	-0.041 (0.072)	
Nmembers	0.027 (0.037)	
Selfint		-0.409 (0.162)**
Sport		0.992 (0.378)***
Gencon		0.291 (0.175)*
Year		0.209 (0.114)*
Decision to meet the trustee	0.323 (0.150)**	
Constant	0.068 (0.147)	-417.095 (227.537)*
Number of obs.		57
Log likelihood		-14.170

* significant at 10%; ** significant at 5%; *** significant at 1%;
Standard errors in brackets

Conclusions and implications (1)

- Commonly observed violations of the Nash equilibrium in investment game have led to a broadened perspective on human preferences and are generally interpreted in terms of fairness, strategic fairness, inequity aversion, altruism, etc.
- We propose an original interpretation for such deviations with a simple original variation of the standard game, by allowing players to opt for an encounter at the end of the game.
- Our results are quite robust and show that the availability of the option and the decision to opt by the trustor significantly increase its contribution. They also seem to suggest that part of this effect materialises also when the opportunity of the encounter is available and the trustor does not opt for it.

Conclusions and implications (2)

- On the overall we interpret such result by arguing that the trustor's extra contribution is affected by a strategic rationale (the expectation that the trustee might opt and therefore contribute more generously) and a relational good rationale (the desire to meet the other and the belief that an extra contribution will create a more favourable environment for the meeting).
- We explain in the paper that, in the latter case, we are testing jointly three distinct hypothesis: i) the trustor has a positive taste for relational goods, ii) believes that the extra contribution will increase the value of such good and iii) the disutility in terms of the expected reduced monetary payoffs generated by its contribution is more than compensated by the benefit of the increased expected value of the relational good.

Conclusions and implications (3)

- When looking at the trustee's choice we observe that the significant extra contribution does not arise simply from the opportunity of the encounter, but only when such opportunity is chosen by the trustee, consistently with the fact that the strategic rationale does not arise for such player.
- Our results give rise to many questions in terms of ideas for further research and extensions and potential application of our findings. We briefly discuss an important one by relating to the literature of the application of trust games in modern corporations whose productivity is always more determined by the performance of complex task which require non overlapping consequences of different workers. Our finding on the positive effect of relational goods on trust and trustworthiness may provide interesting insights for the definition of original incentive structures that foster cooperation in modern corporate environment.

Conclusions

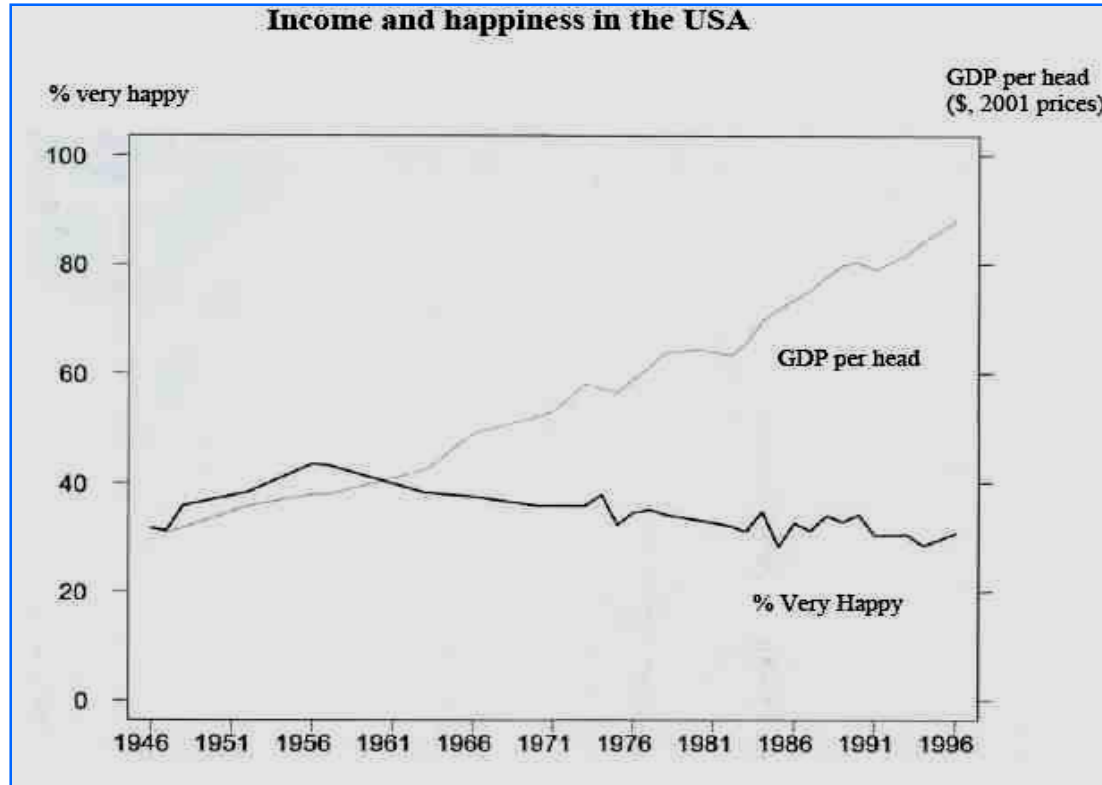
- Further inquiry on the law of motion of social capital: (long run persistence and short run variation)
- How to overcome the endogeneity problem

The Sources of Happiness: Evidence from the Investment Game (the value of generativity)

- **Becchetti L. and Degli Antoni G.**
(2010),, **Journal of Economic Psychology**, 31,
pp.498-509

The Easterlin paradox

Decoupling between gdp growth and life satisfaction ?

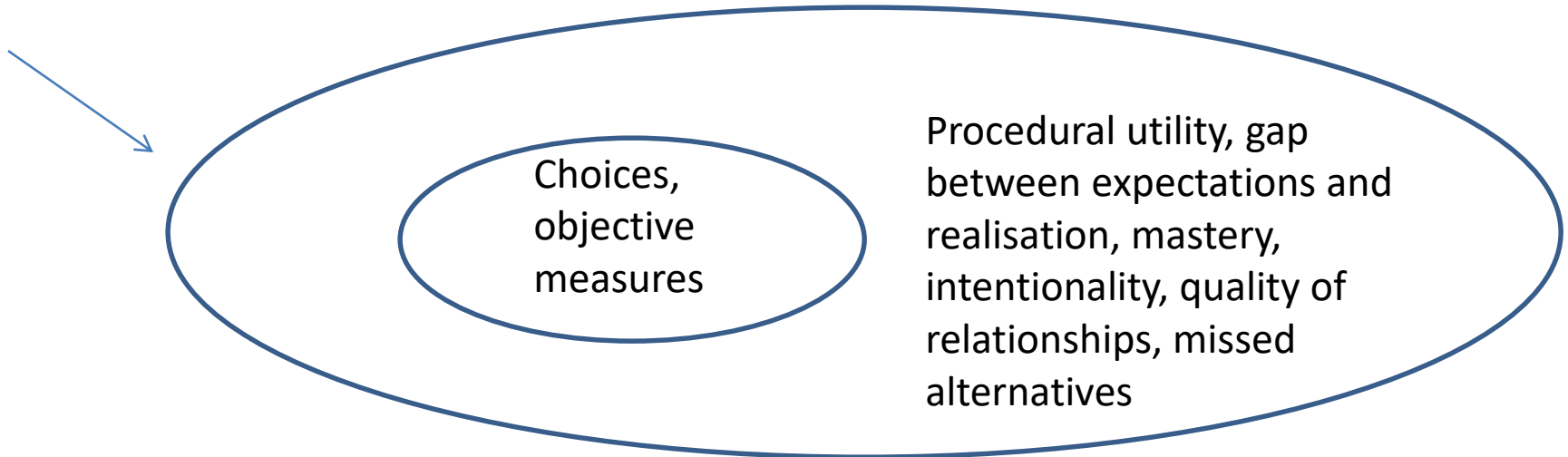


Confirms of the paradox are also reported by Blanchflower and Oswald (2004) for the UK, Frey and Stutzer (2002b) on a large sample of countries using data from the World Database of Happiness and the U.S. Bureau of Census and Veenhoven (1993) for Japan over the period 1958-1987

Why do we study happiness

- Subjective PGG satisfaction is a more comprehensive measure than standard objective measures with strongest predictive power on individual behaviour (see data on Tunisia and Egypt).
- ..lack of satisfaction may rise for the same level of material goods or political rights if in another country there is an increase of them

Satisfaction



Can we trust happiness data? Alesina's argument

1. Happiness studies passed “cultural Darwinian selection” in psychology and sociology (Alesina, Di Tella and MacCulloch, 2004)
2. Positive link between self declared happiness and healthy physical reactions such as smiling attitudes (Pavot 1991, Eckman et al., 1990), heart rate and blood pressure responses to stress (Mayman and Manis, 1993),
3. Link between positive feelings and physical measures of brain activity (higher alfa power in the left prefrontal cortex). Measures of hedonic well being such as life satisfaction is also related with the same activity
4. Individuals choose to discontinue activities associated with low levels of well-being (Kahneman et al., 1993; Frijters, 2000; and Shiv and Huber, 2000).
5. Happiness scores provided by family and friends on the respondent are significantly correlated with the respondent own report (see Sandvik et al., 1993; Diener and Lucas, 1999)

Methodological issues (1)

THE PROBLEMS

i) Cardinality/ordinality; ii) Comparability; iii) Heterogeneity in individual life satisfaction scales; iv) Cultural biases

Clark's doctor argument (does it hurt ?)

Use of ordered logit goes beyond cardinality but not enough for comparability and heterogeneity in individual scales

Fixed effect estimates mainly look at within effects (comparability across time for the same individual)

The vignette's approach (Beegle et al., 2009) demonstrate that heterogeneity in individual life satisfaction scales does not bias results on determinants of life satisfaction

Methodological issues (2)

The life satisfaction versus the momentary affect (Kahneman) approach

The first look at a more general evaluation of life and at a reflection and resounding of experiences

The second is more akin to hedonism and look at immediate experienced life satisfaction

Methodological issues (3)

Happiness and causality

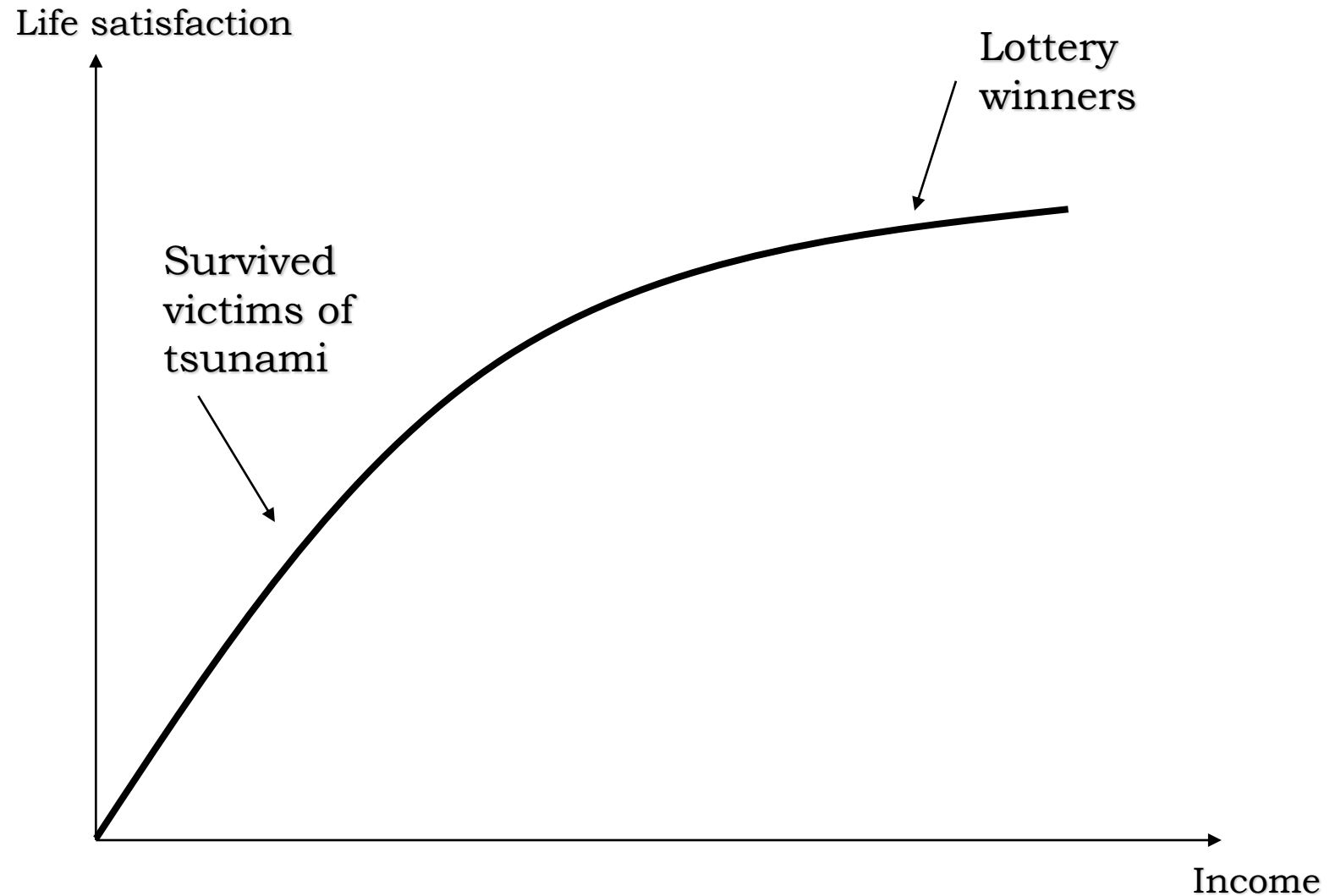
The open issue of (reverse) causality, and endogeneity

- **Differenced ordered probit estimates to single out fixed effects (inherited traits) from effects of regressors on self declared happiness**
- **Identification of exogenous events (ie. lottery wins, aggregate shocks such as transition and German reunification)**
- **Mixture models**
- **IV estimates**
- **Discontinuity design**

The explanation

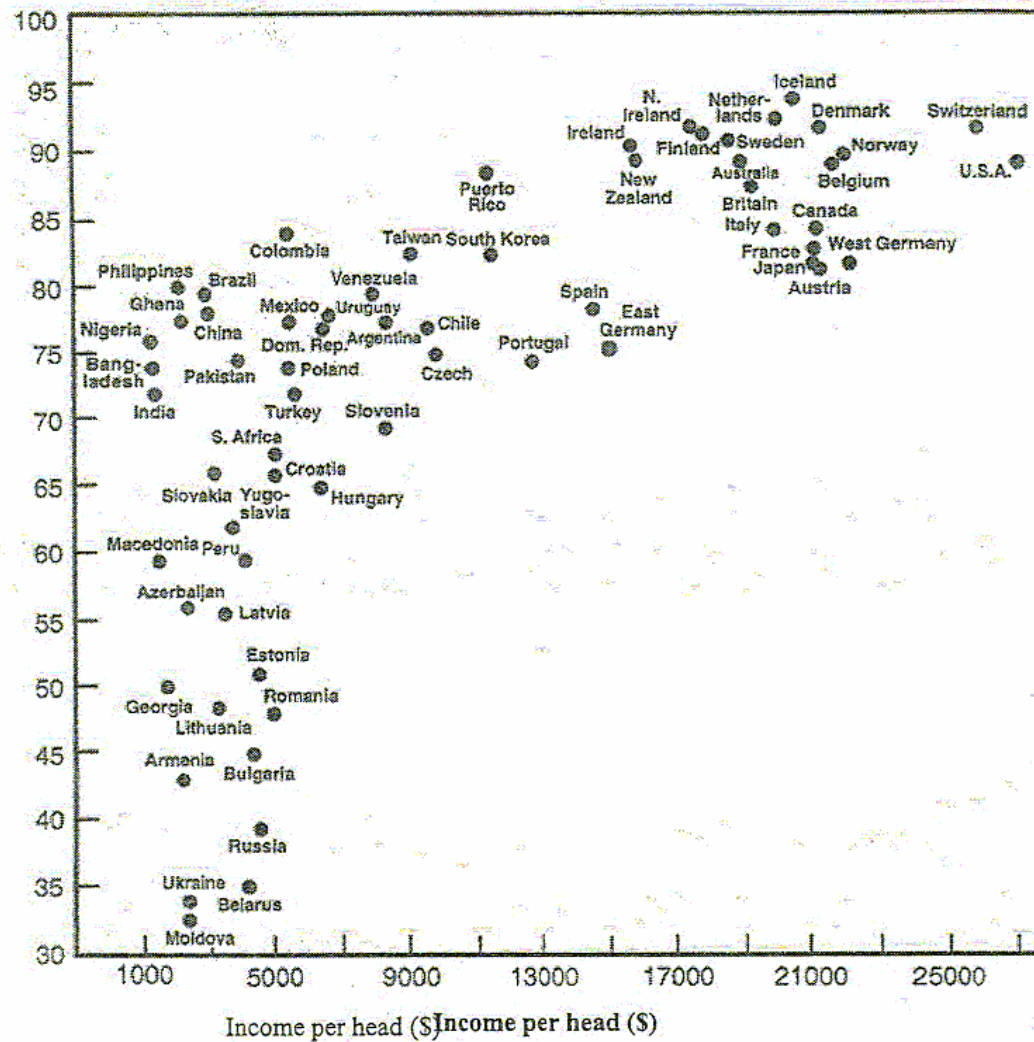
- It does not depend by a nonpositive relationship between income and happiness....

the instantaneous relationship is concave....



As expected....

Happiness (index) Income and happiness



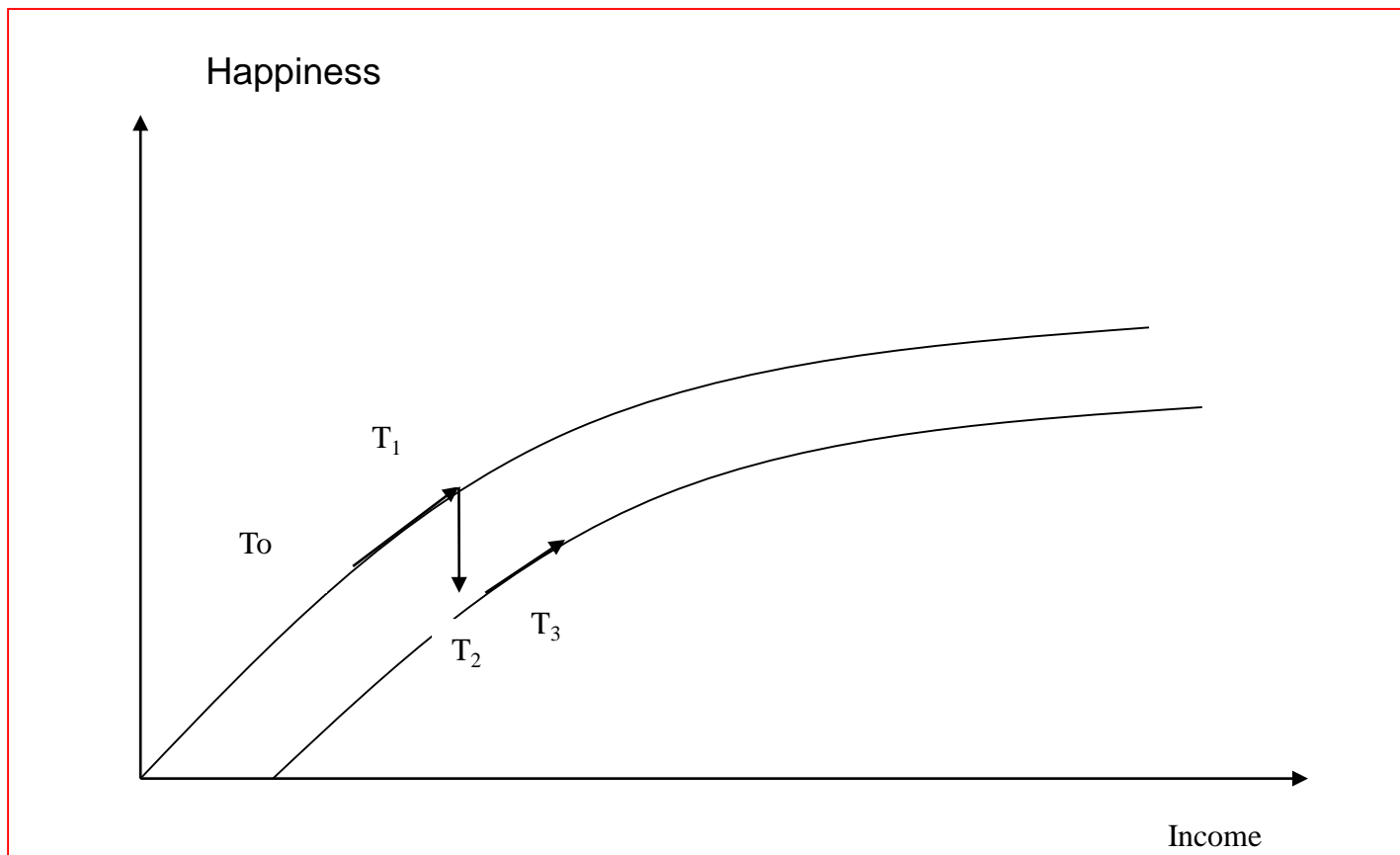
Stylised facts on the income-happiness relationship

- Positive (generally nonlinear) association between per capita income and life satisfaction exists and is robust (see, among others, Easterlin, 1995 and 2000; Frey and Stutzer, 2000; Di Tella, Mc Culloch and Oswald, 2000)
- Relationship of the same sign between changes in income and changes in life satisfaction in panel data (see, among others, Winkelmann and Winkelmann, 1998; Ravallion and Lokshin, 2001; Ferrer-i-Carbonell and Frijters, 2004a; Senik, 2004; Ferrer-i-Carbonell, 2005 and Clark et al., 2006).
- The nexus is confirmed in quasi natural experiments tsunami related effects on income (Becchetti and Castriota, 2007), lottery wins (Gardner and Oswald, 2006b) or changes in real income in Russia and East Germany after transition and reunification (Frijters et al., 2004a, 2004b and 2006).

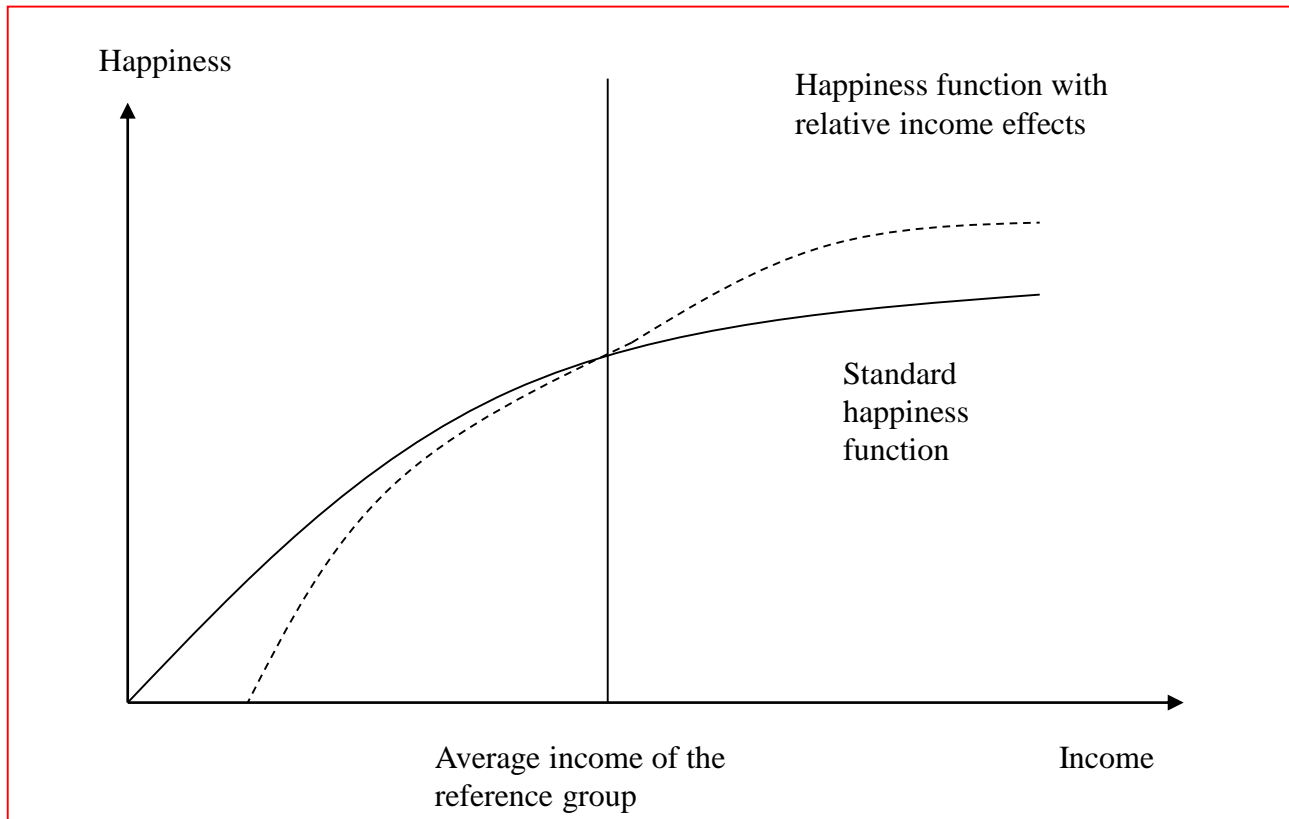
Per capita income is not a good measure of financial wellbeing first explanation

- In the US rising household debt (De Bonis et al. 2007) and increasing inequality (Wilkinson and Pickett, 2009). In Italy saving rates and wealth to income ratios are higher and debt to income ratio far lower than in the US. Health and education are free and a higher stake of pension rights is not affected by stock market volatility..
- If per capita income in the US has risen significantly in the post world war II period, the per capita flow of money available after paying debt interests, health insurance and education for a large share of the population may have not risen much.
- In addition to it higher income inequality may have reduced life satisfaction when comparing material achievements with the average ones of the peers

Hedonic adaptation – second explanation



Relative income third explanation





The “Baumol” disease of relational goods

- ❖ The opportunity cost of time invested in human relationship is grown enormously with the increase in labour productivity and in opportunities of non relational leisure
- ❖ Relational goods require coordinated effort and suffer from coordination failures
- ❖ Human being ends up in a “low relational good” trap
- ❖ All indicators of relational goods show their crisis in Western countries....
- ❖but relational goods have a strong positive effect on individual's life satisfaction
- ❖ *Sources:* Helliwell and Putnam (2004), Bartolini et al. (2007), Corrado and Aslam (2007), Becchetti et al. (2008), Bruni and Stanca (2008), Meier and Stutzer (2008), Powdathvee (2008)



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Relational goods (1)

- *A specific kind of local public goods – nonexcludable and antirival more than non rival - (requiring the joint participation of at least two individuals) for which investment, production and consumption coincide (Gui, 2000; Ulhaner, 1989)*
- Examples of relational goods: friendship, love affection, marriage, various forms of social activities, etc.
- Encounters are the production function of relational goods but not the relational good itself

Relational goods (2)

- They require sincerity or *genuineness* to be valuable (Bruni and Stanca, 2008). These two features cannot be acquired on the market (without being transformed in something completely different) even though they can be generated as a by product of some instrumental activity.
- The quality of relational goods depends on “fellow feelings (Adam Smith’s *Theory of Moral Sentiments*): mental states produced during such non instrumental social interactions. Fellow feelings are, in turn, fuelled by emotional consent and a record of intense experiences lived together (...not necessarily good experiences, even funerals !)

The “Baumol” disease of relational goods

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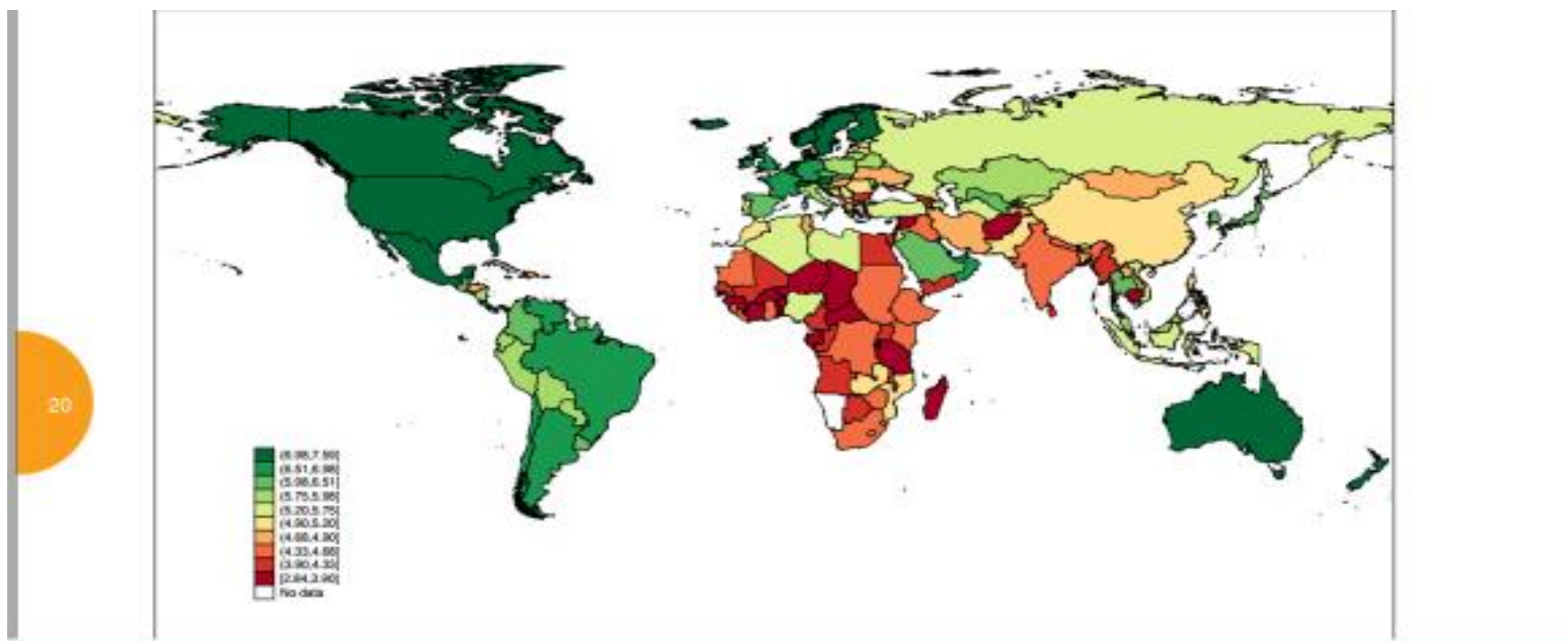
The others in economics

- Rivals in private rivalrous goods 😞
- Those whose performance reduces our happiness in positional competition 😞
- Those without whom we cannot be happy in relational goods 😊

Evidence on relational goods and happiness

- Meyer and Stutzer (2008) find in German reunification an exogenous shock which terminates many social activities and organizations in East Germany and therefore use such event to demonstrate a robust causality nexus going from social activities to life satisfaction.
- Becchetti, Giachin Ricca and Pelloni (2011) demonstrate that the average retirement probability for given age class in the neighboring region is a relevant and valid instrument for relational goods (retirement has strong impact on leisure and enjoyment of relational life) and document how the latter significantly affect life satisfaction.
- Becchetti, Conzo and Corrado (2014) provide non experimental evidence of the relevance of sociability on subjective wellbeing by investigating the determinants of life satisfaction on a sample of Europeans aged above 50. They document using an instrumental variable approach that voluntary work, religious attendance, helping friends/neighbours and participation to community-related organizations affect positively and significantly life satisfaction. Moreover, different combinations between actions and motivations have different impact on life satisfaction thereby providing support for the relevance of these specific “contingent goods” and to the literature of procedural utility (Frey and Stutzer, 2005).

World Happiness Report 2016



6 factors explaining 75 percent of differences of life satisfaction across countries

- Income
- Health
- Freedom of Initiative
- Lack of Corruption
- Quality of relational life
- Gratuitousness

Human beings are sense searchers before being utility maximisers



John Stuart
Mill «better
to be Socrates
unsatisfied
than a pig
satisfied»



Generativity is the synthesis of happiness

Biological generativity: having children

Parental generativity: rearing children

Social generativity: working to build social capital

Political generativity: working to build solutions for one's own country

Generativity of civil economics: working to foster creation of economic value in a socially and environmentally responsible way

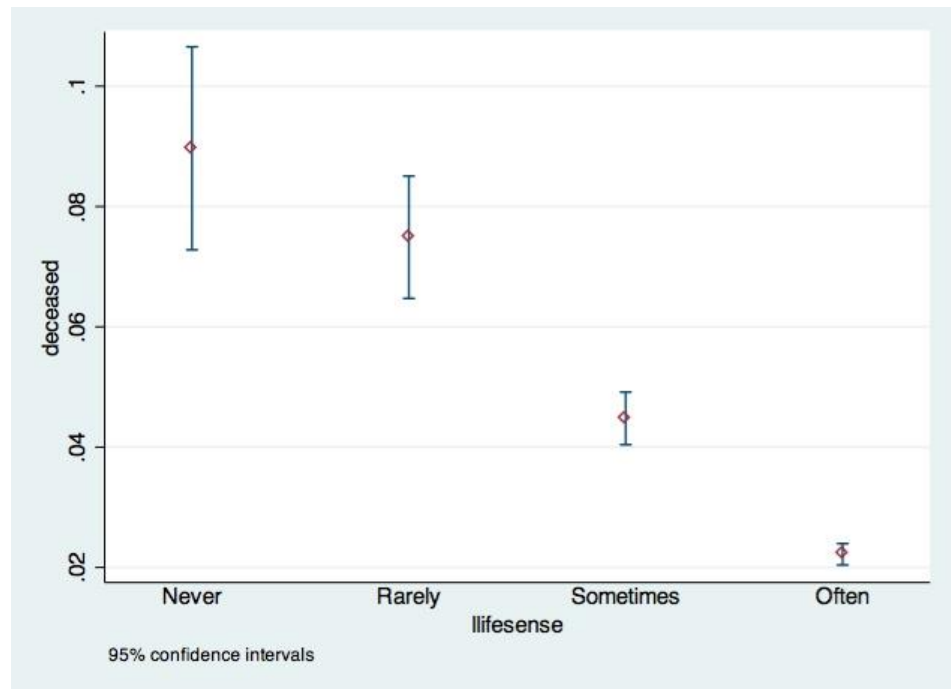
Cultural generativity: working to produce ideas and concepts that can foster generativity

Spiritual generativity: helping people to search sense in faith and links with Absolute



Poverty of life sense is a mortality risk factor...

“Survey of Health, Ageing and Retirement in Europe (SHARE)”, a cross-national panel dataset on health, socio-economic status, and the social and family networks of more than 59,599 Europeans aged 50 and over.



Main result

We find that:

self declared happiness is significantly affected by Trustors' contribution.

We show that our result may be interpreted by considering the idea of social-welfare preferences Charness and Rabin (2002).

However, since there is no correlation between trustors' happiness declarations and the total payoff generated in the game, **we interpret data on trustors' happiness in terms of social-welfare preferences in a deontological perspective**

Our experimental design allows us to exclude the possibility of reverse causation

(We in fact document that the Trustor's contribution-happiness nexus disappears when the questionnaire is filled before starting and knowing the rules of the game.)

Happiness and the Classics

- The importance of happiness has been recognized by the classics (e.g. Malthus, 1798; Marshall, 1890; Veblen, 1899; Dusenberry, 1949 and Hirsch, 1976)
- An example of it is this nice quote from **Malthus (1798)** on Adam Smith work: *“The professed object of Dr. Adam Smith’s inquiry is the nature and the causes of the wealth of nations. There is another inquiry, however, perhaps still more interesting, which he occasionally mixes with it, I mean an inquiry into the causes which affect the happiness of nations”*

Our results and the Classics

Our results do not contradict some famous intuitions on the importance of caring for others for personal happiness

- Adam Smith: “Concern for our own happiness recommends to us the virtue of prudence: concern for that of other people” (Smith, 1759: 385)
- J. S. Mill: “Those only are happy, I thought, who have their minds fixed on some object other than their own happiness, on the happiness of others, on the improvement of mankind, even on some art or pursuit, followed not as a means, but as itself an ideal end. Aiming thus at something else, they find happiness by the way” (Mill, 1893, pg. 117)

Can we trust happiness data?

1. Happiness studies passed “cultural Darwinian selection” in psychology and sociology (Alesina, Di Tella and MacCulloch, 2004)
2. Positive link between self declared happiness and healthy physical reactions such as smiling attitudes (Pavot 1991, Eckman et al., 1990), heart rate and blood pressure responses to stress (Mayman and Manis, 1993),
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5. Happiness scores provided by family and friends on the respondent are significantly correlated with the respondent own report (see Sandvik et al., 1993; Diener and Lucas, 1999)

The Issue of Causality

Our experimental design allows us to exclude the possibility of reverse causation

(We in fact document that the Trustor's contribution-happiness nexus disappears when the questionnaire is filled before starting and knowing the rules of the game.)

The originality of the present paper

1. To the best of our knowledge, it is the first attempt to combine data from investment game and happiness questions. The investment game allowed us to study the effect on happiness of many types of motivations to act (we will show how our data enabled us to discriminate among the different motivations).
2. Second, our design specifically tackled the issue of causality by comparing the answers to the same happiness questions given by players alternatively before or after the experiment.

Empirical happiness literature;

How much more recent event matters?

- Distinction between *experienced utility* and *remembered utility*, “*the way people feel about experiences in real-time and the way they remember their experiences after they are over*” (Khaneman and Krueger 2006, p.5).
- Retrospective evaluations of past experiences are subject to systematic biases with respect to real-time reports (Kahneman, Fredrickson, Schreiber and Redelmeier 1993; Redelmeier and Kahneman 1996).
- Remembered utility is a sort of weighted average in which more importance tend to be attributed to end of period experiences

Empirical happiness literature;

How much more recent event matters?

- Schwarz and Clore (1983): subjects' answers may also be influenced by the current weather
- Schwarz (1987) experiment: life satisfaction of randomly selected subjects who find a coin before the survey is significantly higher

- **On the basis of this literature, we interpret the effect on trustors' happiness declarations in our experiment as the effect of a very recent (with respect to the filling in of the questionnaires) pleasure experience which affected trustors' moment utility.**

Our experiment - I

- 368 students took part in a standard two-player Investment Game (Berg et al., 1995).
- Between-subjects design
- No preplay communication
- Experimental sessions have been realized in three Italian universities: University of Trento, University of Milano-Bicocca and University of Forlì
- Each session lasted on average 45 minutes

Our experiment - II

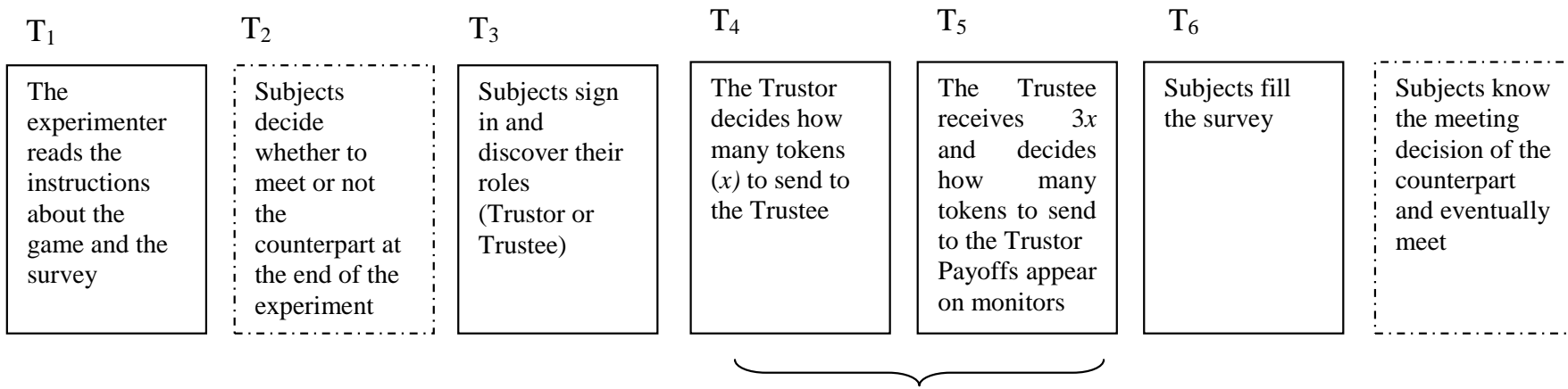
- At the beginning of the game the two players are endowed with 10 tokens (1 token=0.50 euros).
- The Trustor, who is the first to move, must decide how much of her endowment (from 1 to 10 tokens) to send to the Trustee.
- The experimenter triples the amount sent by the Trustor and the resulting amount, which may range from 0 to 30 tokens, is delivered to the Trustee.
- The Trustee must decide how much of the tripled amount to send back to the first mover.
- The meeting option

Our experiment - III

- Our experiment was combined with a survey which collected socio-demographic data and information about subjects' attitudes, habits, feelings, satisfaction with their life and work, and likewise.
- To avoid problems of reverse causality, a randomly chosen part of our sample students filled in the questionnaire after playing and the other part before playing (and knowing the rules of) the game. Happiness declarations of the second group of players can not be correlated with decisions taken (or to be taken) in the game.

Appendix 1. Timing of the experiment

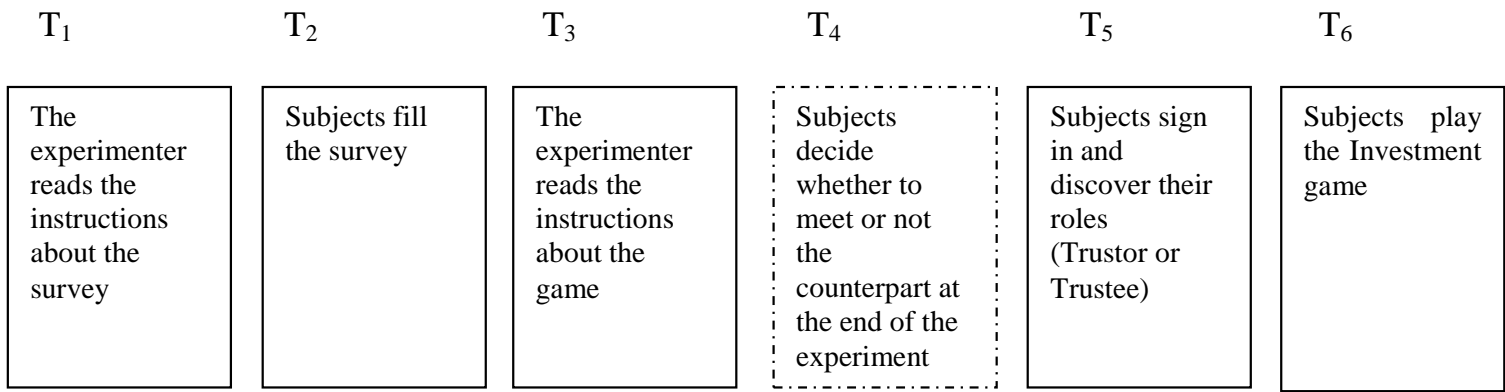
TREATMENT WITH SURVEY AFTER THE GAME



T₂ only in treatment with the meeting option

Investment Game

TREATMENT WITH SURVEY BEFORE THE GAME



T₄ only in treatment with the meeting option

Why do we study happiness?

1. Test of the a priori assumptions on the arguments of the utility function (are individuals “rational fools” ? Sen, 1976)
2. Acknowledgement of the importance of “procedural utility” in addition to “choice utility” (what matters is not just the economic outcome of an action but motivation, path and circumstances which led to that action)
3. It helps economists to understand the non economic consequences of economic decisions, beyond functional specialisation and toward an integration of different social science perspectives (ie. reference group (sociology), hedonic adaptation and inherited traits (psychology), etc.)

Methodological issues

Limits of existing databases

WVS (wide array of countries, unique with LDC, no time series), Eurobarometer (time series but no panels), GSOEP and BHPS (long panels for a single country) Russian Monitoring Survey (short panel)

The open issue of (reverse) causality, and endogeneity

- Differenced ordered probit estimates to single out fixed effects (inherited traits) from effects of regressors on self declared happiness
- Identification of exogenous events (ie. lottery wins Gardner and Oswald (2006) , aggregate shocks such as transition and German reunification Frijters et al. (2004a, 2004b and 2006) , tsunami as a “negative lottery” (Becchetti et al. 2008)

The new frontier of slope heterogeneity with mixture models (Clark et al. 2006)

Descriptive findings

1. Average Trustor contribution is 4.48 (tokens).
2. It does not significantly change if we consider the two subsamples of Trustors who filled in the survey before (4.85) and after (4.22) the game
3. **significant (at 1%) and positive correlation between the amount sent by Trustors and their happiness declaration (0.198) but:**
4. Trustors who filled in the survey before the game (0.079) and not significant
5. Trustors who filled in the survey after the game (0.310) and significant.

Comments on descriptive findings - I

The monetary payoff got by Trustors is negatively correlated with the amount sent (-0.351 , significant at 1%, with regard to the Trustors who filled in the survey after the game)

We can suppose that subjects who feel happy by contributing in the game do not get their happiness from reasons related to their monetary gains (self-interest)

Comments on descriptive findings - II

- **Our finding is not consistent with the Fehr and Schmidt inequality aversion function**

$$U_i(x_i, x_j) = x_i - \alpha_i \max\{x_j - x_i, 0\} - \beta_i \max\{x_i - x_j, 0\}$$

x_i decreases when the amount sent increases, and the difference between x_i and x_j increases with the amount sent by Trustors (the correlation is equal to 0.829, significant at 1%, with regard to the Trustors who filled in the survey after the game). For these reasons, on the basis of players payoffs the utility got by inequity averse Trustors, and, consequently, their happiness declaration, should be lower when the amount sent increases

Comments on descriptive findings - III

- By looking at the evidence on trustees (**their happiness declarations are not affected by the game**), the effect of altruism, consequentialist social-welfare preferences and warm glow may be reasonably excluded.
- In fact, if these motivations are capable of affecting happiness declarations, **they should have also affected trustees' answers.**

Comments on descriptive findings - IV

- The explanation related to the social-welfare preferences **intended in a deontological perspective only applied to trustors.**
- It is the act of sending (and consequently the act of enlarging the total game payoff: the amount sent by trustors is tripled) which affects trustors' happiness and not merely the consequences of the act.
- **In fact, trustees can not act in order to increase the total payoff of the game. Because of that, the deontological motivation does not apply to them.**

Econometric findings

1. **Both ordered logit estimates and OLS regressions, show a positive and significant effect of the amount sent on the level of happiness**
2. Our estimates are also **robust** to the introduction of the location dummy that considers the different places where the experiments have been conducted
3. A standard deviation increase in the amount sent is associated with an increase in the happiness declaration by 0.363 standard deviation
4. The relationship between the amount sent and the happiness declaration holds only for subjects who answer the happiness question after having played the game

Independent variables I

- In order to examine the effect of the amount sent (variable named *Amount_sent*) on the happiness declaration (*Happiness*) we perform ordered logit estimates in which the level of happiness is associated with the amount sent by trustors and with various controls. Controls include:
- variables determined in the game, i.e. the trustors' final payoff (*Trustor_payoff*), the counterpart's final payoff (*Trustee_payoff*), the absolute value of the difference between her own payoff and the counterpart's gain (*Payoff_comparison*), the amount sent back by the trustee (*Payback*), the amount paid back on the total amount received (*Share_payback*);

Independent variables II

- socioeconomic determinants, i.e. age (*Age* and *Age_squared*), gender (gender dummy taking the value of one if the subject is a male) (*Male*), income (*Income*), health (dummy variable which takes the value of 1 if subject declares to have never had health problems) (*Health*), marriage (dummy variable which takes the value of 1 if the subject is married) (*Marriage*) and ethnicity (dummy variable which takes the value of 1 in case of Italian subjects) (*Ethnicity*);
- the location dummies (*Trento* and *Forli*) which consider the different places where the experiments have been conducted;
- a dummy which considers if subjects participated in the treatment with the meeting option (*Meeting_option*) and a dummy (*Meeting_yes*) which distinguishes between players who opted for the meeting and players who do not (in this second case the estimations refer to the sub-sample of people who took part in the treatment with the meeting option).

Table 3 The Determinants of Self Declared Happiness
(Sample of Subjects who Filled in the Survey after the Game)

Equation	1	2	3	4	5	6
	Ologit	Ologit	Ologit	Ologit	Ologit	Ologit
Dependent Variable: <i>Happiness</i>						
Amount_sent	0.253 (0.088)***	0.238 (0.092)**	0.157 (0.186)	0.254 (0.088)***	0.278 (0.098)***	0.205 (0.094)**
Age	0.178 (0.993)	0.186 (0.997)	0.186 (0.997)	0.222 (1.000)	0.186 (0.997)	0.414 (1.066)
Age_squared	-0.003 (0.020)	-0.003 (0.020)	-0.003 (0.020)	-0.003 (0.020)	-0.003 (0.020)	-0.007 (0.022)
Male	0.361 (0.584)	0.365 (0.585)	0.365 (0.585)	0.345 (0.584)	0.365 (0.585)	0.441 (0.619)
Income	-0.030 (0.174)	-0.036 (0.174)	-0.036 (0.174)	-0.028 (0.175)	-0.036 (0.174)	-0.056 (0.199)
Health	1.186 (0.532)**	1.199 (0.533)**	1.199 (0.533)**	1.179 (0.532)**	1.199 (0.533)**	1.124 (0.550)**
Marriage	1.880 (1.159)	1.758 (1.180)	1.758 (1.180)	1.817 (1.173)	1.758 (1.180)	1.869 (1.168)
Ethnicity	-1.614 (1.084)	-1.607 (1.087)	-1.607 (1.087)	-1.683 (1.097)	-1.607 (1.087)	-1.536 (1.100)
Trustor_payoff		-0.040 (0.069)				
Trustee_payoff			0.040 (0.069)			
Payoff_comparison				-0.008 (0.023)		
Payback					-0.040 (0.069)	
Share_payback						-0.532 (1.106)
Trento	0.501 (0.646)	0.455 (0.650)	0.455 (0.650)	0.523 (0.648)	0.455 (0.650)	0.599 (0.705)
Forli	1.057 (0.654)	1.053 (0.656)	1.053 (0.656)	1.069 (0.655)	1.053 (0.656)	1.107 (0.682)
Meeting_option	-0.577 (0.520)	-0.575 (0.523)	-0.575 (0.523)	-0.564 (0.521)	-0.575 (0.523)	-0.760 (0.568)
cut1	-1.678 (11.664)	-2.037 (11.718)	-1.231 (11.729)	-1.275 (11.709)	-1.634 (11.703)	1.051 (12.370)
cut2	-0.931 (11.649)	-1.290 (11.703)	-0.483 (11.714)	-0.531 (11.692)	-0.886 (11.688)	1.813 (12.357)
cut3	0.628 (11.658)	0.270 (11.712)	1.077 (11.722)	1.016 (11.698)	0.674 (11.697)	3.228 (12.373)
cut4	1.123 (11.660)	0.768 (11.715)	1.575 (11.726)	1.506 (11.700)	1.171 (11.700)	3.807 (12.381)
cut5	2.537 (11.655)	2.190 (11.708)	2.996 (11.721)	2.925 (11.696)	2.593 (11.694)	5.109 (12.385)
cut6	4.396 (11.649)	4.042 (11.701)	4.848 (11.713)	4.794 (11.693)	4.445 (11.687)	6.921 (12.384)
cut7	6.654 (11.658)	6.298 (11.714)	7.105 (11.727)	7.060 (11.705)	6.701 (11.701)	9.178 (12.398)
Pseudo. R ²	0.115	0.117	0.117	0.116	0.117	0.107
Prob > χ^2	0.010	0.014	0.014	0.015	0.014	0.044
Number of obs.	64	64	64	64	64	60

* Significant at 10%; ** significant at 5%; *** significant at 1%; Standard errors in brackets.

Table 5 The Determinants of Self Declared Happiness
(Sample of Subjects who Filled in the Survey before the Game)

Equation	1	2	3	4	5	6
	Ologit	Ologit	Ologit	Ologit	Ologit	Ologit
Dependent Variable: <i>Happiness</i>						
Amount_sent	-0.017 (0.090)	-0.040 (0.090)	0.091 (0.121)	0.016 (0.093)	-0.106 (0.113)	-0.054 (0.126)
Age	-0.249 (0.516)	-0.255 (0.512)	-0.255 (0.512)	-0.127 (0.521)	-0.255 (0.512)	-0.207 (0.526)
Age_squared	0.006 (0.009)	0.006 (0.009)	0.006 (0.009)	0.004 (0.009)	0.006 (0.009)	0.005 (0.009)
Male	0.330 (0.556)	0.197 (0.564)	0.197 (0.564)	0.309 (0.555)	0.197 (0.564)	0.334 (0.726)
Income	0.102 (0.153)	0.095 (0.157)	0.095 (0.157)	0.137 (0.156)	0.095 (0.157)	0.081 (0.165)
Health	1.327 (0.584)**	1.487 (0.603)**	1.487 (0.603)**	1.394 (0.589)**	1.487 (0.603)**	1.240 (0.649)*
Marriage	0.198 (1.723)	-0.289 (1.770)	-0.289 (1.770)	0.093 (1.727)	-0.289 (1.770)	-0.412 (1.797)
Ethnicity	-0.824 (1.299)	-0.806 (1.321)	-0.806 (1.321)	-0.914 (1.335)	-0.806 (1.321)	-0.591 (1.319)
Trustor_payoff		0.066 (0.052)				
Trustee_payoff			-0.066 0.052			
Payoff_comparison				-0.035 (0.024)		
Payback					0.066 (0.052)	
Share_payback						1.125 (1.012)
Trento	0.512 (1.009)	0.673 (1.020)	0.673 (1.020)	0.284 (1.014)	0.673 (1.020)	0.743 (1.036)
Forli	1.518 (0.653)**	1.550 (0.643)**	1.550 (0.643)**	1.434 (0.654)**	1.550 (0.643)**	1.645 (0.714)**
Meeting_option	-0.052 (0.633)	0.040 (0.641)	0.040 (0.641)	0.151 (0.651)	0.040 (0.641)	-0.109 (0.683)
cut1	-5.968 (7.067)	-5.493 (7.030)	-6.808 (7.039)	-4.450 (7.130)	-6.150 (7.016)	-5.197 (7.148)
cut2	-5.237 (7.027)	-4.743 (6.990)	-6.057 (6.997)	-3.723 (7.090)	-5.400 (6.974)	-4.443 (7.105)
cut3	-4.794 (7.008)	-4.289 (6.971)	-5.603 (6.975)	-3.287 (7.071)	-4.946 (6.954)	-3.982 (7.083)
cut4	-3.283 (6.994)	-2.751 (6.956)	-4.066 (6.957)	-1.783 (7.061)	-3.408 (6.937)	-2.552 (7.067)
cut5	-2.082 (7.004)	-1.526 (6.963)	-2.841 (6.960)	-0.542 (7.075)	-2.183 (6.942)	-1.294 (7.076)
cut6	-0.364 (7.001)	0.220 (6.959)	-1.095 (6.950)	1.288 (7.089)	-0.438 (6.935)	0.363 (7.080)
cut7	2.195 (7.001)	2.818 (6.967)	1.503 (6.951)	3.917 (7.106)	2.160 (6.939)	2.909 (7.087)
Pseudo. R ²	0.082	0.091	0.091	0.094	0.091	0.095
Prob > χ^2	0.208	0.187	0.187	0.162	0.187	0.231
Number of obs.	54	54	54	54	54	48

* Significant at 10%; ** significant at 5%; *** significant at 1%; Standard errors in brackets.

Robustness check

- First, we decided to control our result by considering the subsamples of subjects who: 1) played in the treatment without the meeting option; 2) played in the treatment with the meeting option (in this second case, the dummy variable *Meeting_yes* which takes into account the decision of subjects on to meet or not to meet their counterpart is included).
- Second, given the high number of missing observations related to the income variable, we performed all the regressions reported in table 3 also without it. Table 4 only reports the coefficients of *Amount_sent* in these different checks.

**Table 4 The Effect of the Amount Sent on Happiness Declaration – Robustness Check
(Sample of Subjects who Filled in the Survey after the Game)**

	Estimations on the sub sample of players who played without the meeting option (Number of Obs. 30)	Estimations on the sub sample of players who played with the meeting option (Number of Obs. 34)	Estimations on the whole sample without the variable Income (Number of Obs. 106)
	Coefficient of Amount_sent		
Equation 1	0.415 (0.159)***	0.364 (0.175)**	0.236 (0.068)***
Equation 2	0.456 (0.165)***	0.347 (0.183)*	0.188 (0.072)***
Equation 3	0.725 (0.298)**	0.261 (0.370)	-0.010 (0.147)
Equation 4	0.429 (0.161)***	0.439 (0.183)**	0.238 (0.068)***
Equation 5	0.321 (0.176)*	0.390 (0.194)**	0.287 (0.074)***
Equation 6	0.426 (0.194)**	0.360 (0.178)**	0.191 (0.076)**
	(Number of obs 26)		(Number of obs 26)

Ordered logit estimations. Dependent Variable: *Happiness*. Equations 1-6 related to the sub sample of players who played without the meeting option include the same variables of the corresponding equations 1-6 reported in Table 1. Equations related to the sub sample of players who played in the treatment without the meeting option also include the variable *Meeting_yes*. Equations 1-6 related to the whole sample of players include the same variables of the corresponding equations 1-6 reported in Table 1 except the variable *Income*. * Significant at 10%; ** significant at 5%; *** significant at 1%; Standard errors in brackets.

**Table 6 The Effect of the Amount Sent on Happiness Declaration – Robustness Check
(Sample of Subjects who Filled in the Survey after the Game)**

	Estimations on the sub sample of players who played without the meeting option OLS Estimations (Number of Obs.21)	Estimations on the sub sample of players who played with the meeting option Ordered logit estimations (Number of Obs.33)	Estimations on the whole sample without the variable Income Ordered logit estimations (Number of Obs. 68)
	Coefficient of Amount_sent		
Equation 1	0.023 (0.127)	-0.258 (0.147)*	0.047 (0.077)
Equation 2	-0.153 (0.149)	-0.257 (0.146)*	0.036 (0.078)
Equation 3	0.217 (0.155)	-0.233 (0.206)	0.124 (0.110)
Equation 4	0.101 (0.147)	-0.229 (0.151)	0.049 (0.080)
Equation 5	-0.338 (0.225)	-0.269 (0.162)*	-0.007 (0.095)
Equation 6	0.325 (0.374)	-0.325 (0.182)*	-0.050 (0.111)
	(Number of Obs.16)	(Number of Obs.32)	(Number of Obs.59)

Dependent Variable: *Happiness*. Equations 1-6 related to the sub sample of players who played without the meeting option include the same variables of the corresponding equations 1-6 reported in Table 1. Equations related to the sub sample of players who played in the treatment without the meeting option also include the variable *Meeting_yes*. Equations 1-6 related to the whole sample of players include the same variables of the corresponding equations 1-6 reported in Table 1 except the variable *Income*. * Significant at 10%; ** significant at 5%; *** significant at 1%; Standard errors in brackets.

Conclusions - I

- The present paper drew on data collected in an investment game to investigate if motivations associated with self-interested preferences, inequity aversion, altruism, warm glow, social-welfare preferences, trust or reciprocity affect individuals' self-declared happiness.
- The descriptive analysis does not reveal any effect of the game on happiness declarations of trustees. By contrast, the amount sent by trustors (and, consequently, the total payoff generated in the game) positively affects their ex post happiness declarations.
- Since no relation exists between the happiness declarations and the amount sent with respect to trustors who filled in the questionnaires before the game, we may consider that there is a specific causality direction that goes from the amount sent to happiness.

Conclusions - II

- The correlation between the amount sent by trustors and their ex post happiness may not be explained by considering either self-interest (the amount sent is negatively correlated with trustors' payoffs) or inequity aversion.

Moreover, by comparing evidence on trustors and trustees, we also tend to rule out explanation related to consequentialist social-welfare preferences, warm glow and altruism.

If these motivations were capable of affecting happiness declarations, they should have also affected trustees' answers.

Conclusions - III

- Because of that, according to our interpretation, the effect of the amount sent on trustors' happiness is due to social-welfare preferences according to a deontological perspective. It is the act of sending (and consequently the act of enlarging the total game payoff) which affects trustors' happiness and not merely the consequences of the act.

Follow up

- Our result shows the importance of the deontological character of agents' preferences at least with respect to the investment game. It could be interesting to investigate, by combining experimental data and questionnaires, if also in other settings deontological preferences have an important role in explaining human actions.

Cooperative membership and trust: experiment in Panay (Philippines)

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Why cooperative membership should be perceived as a signal of trust and trustworthiness ?

- From coop membership to trust and trustworthiness

Cooperative life implies a series of actions in which members make themselves vulnerable to their counterparts exactly as in the investment game. Hence, with their pattern of reciprocal obligations, cooperatives may stimulate and reinforce trust and trustworthiness of affiliated members.

- From trust and trustworthiness to coop membership

Due to the importance of the above mentioned characteristics in order to achieve organisational success, cooperatives may select their members by admitting only those who have higher trust and trustworthiness so that membership approval and persistence is a signal that the participant has been considered and has behaved trustworthily for a given period of time.

More in detail

Cooperative members experience participation to an organization which deals for them with some crucial features of their business such as technical assistance, marketing and delivery of products to local and foreign markets.

Membership acceptance and persistence in cooperative requires by itself a degree of trustworthiness of members which are required to abide by cooperative rules.

The cooperative generally (and specifically in the case under our scrutiny) requires from members all (or a considerable part of) their product/harvest, irrespectively of the price which affiliated farmers could get by selling it directly on the market. In essence, cooperative members learn through affiliation years to rely on an institution which provides them payment and other services in exchange of an affiliation fee and the obligation to confer their production.

In group bias result

- we assume that cooperative membership is a trust and trustworthiness reinforcing device and, as such, it affects (in an investment game setting) both (trustors and trustees) contributions and beliefs, thereby generating payoff enhancing effects.
- The results of our field experiment do not reject this hypothesis when we look at trustors' contribution, beliefs on trustees' responses and trustees' first and second order beliefs.
- However, trustworthiness of members fails to meet the expectations of non member trustors who rely on a relatively higher contribution from them vis à vis non members.
- This result shows indeed that, contrary to non members' expectations, the positive affiliation-trustworthiness link works only between coop members.

Panay organisation

- fair trade organization based in the island of Panay, in the Visayas archipelago in the center of the Philippines. It was born in 1991 and at the time of the experiment (2009) it had more than 350 members involved in the production of mascobado sugar and banana chips
- three eligibility criteria to become member: (i) having less than three hectares of land, (ii) being a local resident, and (iii) paying an annual fee of 50 Pesos
- Panay's features consistent with the hypothesis we want to test.
 - i) the annual fee is provided by members under the expectation of (technical assistance, extra profit redistribution, financial) services from the cooperative.
 - ii) there are delays between harvest and cooperative payments.
 - iii) the same cooperative ethos and training are based on the slogan that membership cooperation allows to achieve higher results than independence.

Sampling scheme

- Treatment group: 150 individuals randomly selected from the list of PFTC affiliated mascobado sugar producers (224 out of 350 total members, the remaining 126 producing bananas for the chips) in the two villages of Kamada and Jafaba
- Control group: 150 farmers randomly selected from the same villages who are affiliated to neither any cooperative nor producer group.

list of names of farmers (from which we extracted the control sample) living close to treatment group farmers and are thereby more likely to have similar characteristics (education, income, job, etc.).

The trust investment game (2)

- both players are endowed with 10 tokens. The exchange rate is 1 token per 20 pesos which corresponds to around 0.3 Euros
- The maximum amount the trustor (trustee) can win in the game is 600 (800) Pesos, plus 10 (20) extra Pesos for questions on first and second order beliefs (see end of this section). These sums correspond to 80% (135%) of an average farmer's weekly salary.

The trust investment game (3)

- Strategy method for trustees *"How much do you send back to the trustor if he sends to you 20 pesos? How much if he sends 40 pesos?...How about if he sends all her initial endowment of 200 pesos?"*
- At the end of the two rounds, players' beliefs are elicited through ex-post surprise questions on how much they believe the counterpart has actually *sent* (if trustee) or *returned* (if trustor). Consistently with the literature, we will refer to the answers to those questions as *first order beliefs* (FOB). With another surprise question we ask trustees' to guess what are the counterparts' beliefs about their strategy, that is, we elicit their *second order beliefs* (SOB)

The matching procedure

		<i>TRUSTEE</i>		
		M	NM	<i>Tot</i>
<i>TRUSTOR</i>	M	75	75	150
	NM	75	75	150
<i>tot</i>		150	150	300

Hypothesis testing

a) **Trustor contribution** $H_{0A}: c^{Tr} | s_M = c^{Tr} | s_{N-M}$ vs. $H_{1A}: c^{Tr} | s_M > c^{Tr} | s_{N-M}$

b) **Trustor belief** $H_{0B}: b^{Tr} | s_M = b^{Tr} | s_{N-M}$ vs. $H_{1B}: b^{Tr} | s_M > b^{Tr} | s_{N-M}$

c) **Trustee contribution** $H_{0C}: c^{Te} | s_M = c^{Te} | s_{N-M}$ vs. $H_{1C}: c^{Te} | s_M > c^{Te} | s_{N-M}$

d) **Trustee first order belief** $H_{0D}: b_I^{Te} | s_M = b_I^{Te} | s_{N-M}$ vs. $H_{1D}: b_I^{Te} | s_M > b_I^{Te} | s_{N-M}$

e) **Trustee second order belief** $H_{0E}: b_{II}^{Te} | s_M = b_{II}^{Te} | s_{N-M}$ vs. $H_{1E}: b_{II}^{Te} | s_M > b_{II}^{Te} | s_{N-M}$

Descriptive findings

- *Both member and non member trustors give more to member than non member trustees.* The difference for member trustors is 87.2 against 52.07 pesos, while that for non member trustors is 61.73 against 49.6 pesos.
- Such difference finds correspondence in trustors' expectations on trustees' responses. Non member trustors expect 94.93 against 72.4 respectively from members and non members, while the same two numbers are 134.47 and 44.87 for member trustors.
- Regardless of the member/non member status of trustees, member trustors give more (69.93 against 55.66) and expect more (89.6 against 83.6) than non members

Table 3.1 - Trustor's contributions and expectations

Trustor		Trustee		Total
		<i>NM</i>	<i>M</i>	
<i>NM</i>	Sent	49.6	61.73	55.66
	Expected	72.4	94.93	83.66
<i>M</i>	Sent	52.07	87.2	69.63
	Expected	44.87	134.47	89.67
Total	Sent	50.83	74.47	62.65
	Expected	58.63	114.7	86.67

Table 4.1–Trustee’s response, I and II order beliefs

Trustee		Trustor		Total
		<i>NM</i>	<i>M</i>	
<i>NM</i>	Response	176.05	167.24	<i>171.65</i>
	I belief	40.7	59.2	<i>49.9</i>
	II belief	68.33	89.6	<i>78.97</i>
<i>M</i>	Response	158.22	186.69	<i>172.46</i>
	I belief	50.13	89	<i>69.57</i>
	II belief	76.2	131.67	<i>103.93</i>
Total	Response	<i>167.14</i>	<i>176.96</i>	<i>172.05</i>
	I belief	<i>45.37</i>	<i>74.1</i>	<i>59.73</i>
	II belief	<i>72.27</i>	<i>110.63</i>	<i>91.45</i>

Table 4.2 -Hypothesis testing on trustee's response, I and II order beliefs

Test type	Average difference	z- stat	p-value
TESTS ON DISTRIBUTIONS [Two-sample Kolmogorov-Smirnov test for equality of distribution functions]			
<i>a) trustee's response to a M vs. a NM trustor</i>	0.12		(0.229)
<i>b) trustee's I order belief about M vs. a NM trustor</i>	0.39		(0.000)
<i>c) trustee's II order belief about M vs. a NM trustor</i>	0.33		(0.039)
<i>d) response of M vs. a NM trustee</i>	0.15		(0.058)
<i>e) I order belief of M vs. a NM trustee</i>	0.28		(0.000)
<i>f) II order belief of M vs. a NM trustee</i>	0.39		(0.000)
NON PARAMETRIC TESTS [Wilcoxon rank-sum equality test]			
<i>a) trustee's response to a M vs. a NM trustor</i>		-1.647	(0.0995)
<i>b) trustee's I order belief about M vs. a NM trustor</i>		-7.007	(0.000)
<i>c) trustee's II order belief about M vs. a NM trustor</i>		-5.376	(0.000)
<i>d) response of M vs. a NM trustee</i>		0.041	(0.9676)
<i>e) I order belief of M vs. a NM trustee</i>		-4.185	(0.000)
<i>f) II order belief of M vs. a NM trustee</i>		-2.727	(0.0064)

Synthesis of econometric findings

TRUSTOR CONTRIBUTION (1)

- any additional year of job experience rises by around .5 percent the amount sent by trustors
- Members give significantly more net of the “framing” trustee member effect
- each year of trustor’s cooperative affiliation is significant and adds 1.2 pesos to what the trustors send (robust to trustee member effect).... This goes beyond framing
- the matching between two affiliated players positively affects trustor contribution after controlling for the trustee type status

Synthesis of econometric findings

TRUSTOR CONTRIBUTION (2)

- the matching between two affiliated players positively affects trustor contribution after controlling for the trustee type status
- We can consider this as the (trust and trustworthiness induced) value added of the matching between two cooperative members, net of the signalling effect (the trustee type variable) which is also significant and is by construction an average contribution response to this variable of both member and non member trustors.

Synthesis of econometric findings

- TRUSTORS' BELIEFS
- Trustors expect up to 57 points more from member trustees
- Each additional year of cooperative affiliation for trustors lead them to expect 1.9 points more from the trustee and the result is robust to the trustee type effect.
- Since each affiliation year implies a 1.2 effect on trustor's contribution (Table 5, column 5), strategic altruism may be thereby considered a main driver of the extra contribution

A bonding channel

- *Differential sending and expecting (whithin effect)*
- both trustor's status and affiliation years have a positive and significant effect ("bonding channel" by which the trustor member status and seniority widens the gap between her contribution to a member versus non member trustee)
- This implies that the trust potential of membership is stronger within the cooperative boundaries than outside them
- ... while preference heterogeneity and selection bias may be consistent explanations for between effects (affiliated trustors may give more because they are less risk averse, more altruist, are less betrayal averse, are more inequity averse, etc. than non affiliated), they cannot explain within effects since in the latter players characteristics are fixed (at least, we may assume, in the short run) and is the change in the counterpart characteristics which drives the result. Unless we assume complex structure of counterpart dependent preferences.

TRUSTEE RESPONSE

- trustee affiliation status is not significant while the trustor status is

Two consequences. First, the extra trust of trustors on member trustees (independent from trustor status) is not corresponded. Second, the suspect that the excess trust of affiliated trustors might be generated by a social norm for which all (trustors and trustees) affiliated farmers are expected to behave more generously does not find correspondence in the behavior of trustee which does not follow the same rule

TRUSTEE RESPONSE

- If we estimate trustees' responses conditional to each of the possible trustors' contributions we find that the trustor status effect is significant only for trustors contributions below average.
- If we split the sample into member and non member trustees we find that the result is driven by member trustees.
- This seems to reveal that trustees do not want to reciprocate negatively other members.

- important rationale for the bonding behaviour of trustees (giving more to affiliated trustors) since we find that *trustee affiliation affects indirectly their trustworthiness via second order beliefs*, even though it does not affect it directly (trustees' affiliation is not significant on trustees response).
- the higher contribution of member trustees to member trustors is in part driven by the fact that they expect that member trustors expect more from them. Put in other terms, we may say that trustees reciprocate (do not want to betray) what they assume are the higher expectations of member trustors.

- TRUSTEES' FOB

trustees expect member trustors to have sent more in comparison with non member trustors. This expectation is higher for member trustees and grows proportionally in the number of trustee's affiliation years.

TRUSTEES' SOB

the longer trustees are affiliated, the more they believe that trustors will expect from them . Qui si potrebbe controllare se SOB dei trustee sono corrette mettendo nella stima dei FOB dei trustors il numero di anni di affiliazione dei trustees.

Trustor sending

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var.. amount sent by trustors						
Controls	YES	YES	YES	YES	YES	YES
Trusteetype			23.93*** (2.668)		23.93*** (2.668)	10.34*** (3.553)
Trustortype		16.11** (7.034)	16.11** (7.046)			
affil_years				1.251** (0.621)	1.251** (0.622)	
Trustortrustee						27.37*** (6.637)
Observations	290	290	290	290	290	290
R-squared	0.048	0.073	0.157	0.064	0.148	0.178

Variance clustered for individuals. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Trustors' beliefs about trustees' response

	(1)	(2)	(3)	(4)	(5)	(6)
CONTROLS	YES	YES	YES	YES	YES	YES
trusteetype			57.34*** (6.064)		57.34*** (6.064)	31.47*** (5.817)
trustortype		13.71 (11.49)	13.71 (11.51)			
affil_years				1.912* (0.982)	1.912* (0.984)	
trustortrustee						52.10*** (13.23)
Observations	290	290	290	290	290	290
R-squared	0.028	0.033	0.177	0.039	0.182	0.220

Trustors' differential sending and expecting when playing/not playing with a coop member

	(1)	(2)	(3)	(4)
Dep Var:	Differential sending		Differential expecting	
CONTROLS	YES	YES	YES	YES
trustortype	28.32***		76.52***	
	(6.146)		(12.17)	
affil_years		1.695***		6.763***
		(0.595)		(1.920)
Observations	145	145	145	145
R-squared	0.222	0.140	0.251	0.220

Trustees' responses

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var.						
CONTROLS	YES	YES	YES	YES	YES	YES
trusteetype		-4.916 (9.38)	-4.916 (9.403)			
trustortype			9.635** (4.009)		9.635** (4.009)	0.240 (5.083)
affil_years				-1.420 (1.442)	-1.420 (1.444)	
trustortrustee						19.77** (8.218)
Observations	282	282	282	282	282	282
R-squared	0.039	0.041	0.050	0.049	0.058	0.065

Trustees' first order beliefs

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var.: Trustees' expectations about Trustors' contributions						
CONTROLS	YES	YES	YES	YES	YES	YES
trusteetype		21.83*** (5.784)	21.83*** (5.795)			
trustortype			28.72*** (3.054)		28.72*** (3.054)	14.55*** (3.494)
affil_years				2.628*** (0.742)	2.628*** (0.744)	
trustortrustee						29.83*** (5.991)
Observations	282	282	282	282	282	282
R-squared	0.038	0.096	0.249	0.097	0.250	0.259

Trustees' second order beliefs

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var.Trustees' expectations on how much Trustors expect them to send						
CONTROLS	YES	YES	YES	YES	YES	YES
trusteetype		10.40 (8.718)	10.40 (8.734)			
trustortype			39.18*** (5.165)		39.18*** (5.165)	24.62*** (5.569)
affil_years				2.561** (1.233)	2.561** (1.236)	
trustortrustee						30.65*** (9.664)
Observations	282	282	282	282	282	282
R-squared	0.065	0.069	0.166	0.084	0.181	0.186

Trustees' responses conditional to the level of trustor's contributions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	imp20	imp40	imp60	imp80	imp100	imp120	imp140	imp160	imp180	imp200
CONTROLS	YES	YES	YES	YES	YES	YES	YES	YES	YES	(4.060)
trustortype	7.234***	4.787*	8.688** *	9.539**	9.220**	9.716*	12.30*	7.660	11.03	16.17*
	(2.196)	(2.576)	(3.303)	(3.918)	(4.249)	(4.956)	(6.267)	(6.160)	(6.696)	(8.960)
affil_years	0.528	0.0105	0.698	0.0068 1	-0.0372	-1.754	-1.836	-4.061	-3.911	-3.842
	(0.575)	(0.696)	(0.878)	(1.186)	(1.388)	(1.545)	(1.853)	(2.502)	(2.685)	(2.813)
Observations	282	282	282	282	282	282	282	282	282	282
R-squared	0.044	0.035	0.068	0.070	0.058	0.057	0.040	0.076	0.063	0.061

Table 3.2 - Hypothesis testing on trustors' contribution and beliefs

Test type	Average difference	z- stat	p-value
TESTS ON DISTRIBUTIONS [Two-sample Kolmogorov-Smirnov test for equality of distribution functions]			
<i>a) trustor's contribution to a M vs. a NM trustee</i>	0.2933		(0.000)
<i>b) trustor's expectation from a M vs. a NM trustee</i>	0.3867		(0.000)
<i>c) contribution of a M vs. a NM trustor</i>	0.16		(0.043)
<i>d) expectation of a M vs. a NM trustor</i>	0.13		(0.139)
NON PARAMETRIC TESTS [Wilcoxon rank-sum equality test]			
<i>a) trustor's contribution to a M vs. a NM trustee</i>		-5.658	(0.000)
<i>b) trustor's expectation from a M vs. a NM trustee</i>		-6.751	(0.000)
<i>c) contribution of a M vs. a NM trustor</i>		2.412	(0.0159)
<i>d) expectation of a M vs. a NM trustor</i>		0.782	(0.4343)

Conclusions (1)

- Four of our five hypothesis are confirmed: trustors give more if they are coop members and expect more from member trustees. Trustees expect more from member trustors (first order beliefs) and believe that trustors expect more from them if they are members (second order beliefs).
- Such findings may be partially due to a framing effect (the information revealed by the experimenter on the counterpart status may affect their choices) but not only to it (member trustors give more irrespective of the trustee status and trustors affiliation years positively affect their contributions).
- member trustees do not give more as expected from trustors (and as they assume trustors expect from them). More specifically, we identify an in group bias in trustees contributions where members (non members) give more to members (non members). We also provide an interesting rationale for this behaviour: trustees affiliation years affect their second order beliefs and trustees believe that trustors expect more from them if the latter are members. *In a sense, trustees, by giving more to member trustors, reciprocate the higher expectations they believe trustors have toward them.*

Conclusions (2)

- This “bonding” element may be an obstacle in a repeated game framework to the capacity of coop membership in being a trust and trustworthiness reinforcing and a payoff enhancing device.
(end game behaviour which would not be enacted in a repeated game horizon ?)
However the question remains on why, in spite of anonymity, trustees’ behaviour is more opportunistic versus non members than members. The moral obligation to reciprocate the higher expectations of member trustors mentioned above may be an answer.
- A confirmation that the trust and trustworthiness potential of cooperative membership is stronger between members than outside the coop circle is that membership status and seniority widen trustors’ differential sending (that is, the difference in trustor contributions to member versus non member trustees).
- These two final results lead us to conclude that, irrespective of the causality nexus between the two variables which is difficult to ascertain, cooperative membership is a signal which produces trust and trustworthiness effects even though such effects appear stronger within (even though not limited to) the cooperative circle.

The Nairobi experiment



Location: The slum of Kybera (Nairobi)

- Very low per capita income and levels of trust (scarcity of social capital severe in some economic interactions which are not always subject to formal contracts and regulation such as land property and recovery of non performing loans from cosigners or guarantors in microfinance lending schemes)
- Cassar and Wydick (2011) show that in a microfinance game carried on in five different countries (Armenia, Philippines, India, Kenya and Guatemala) the levels of contribution are lowest in the African country
- Bohnet and Greig (2009) find similar results in a one shot trust game (balanced reciprocity)

Cooperation in Nairobi: “*Harambee*”

- *Harambee* ("let's pull together" in Swahili) is the local cooperation for the realisation of small infrastructures in the slums, a well known feature in Nairobi
- Fundraising for public goods helps to construct schools, clinics, water spouts (Greig and Bohnet, 2009), infrastructures like roads, bridges, systems to generate and carry electricity and churches (Wilson, 1992)
- Question: whether and under what circumstances this practice (and, more in general, activities with public good game features) may affect social capital, thereby contributing to strengthen an important factor of economic development?

The “sandwich” experiment

1. TG1 (full sample, strategy method, payoff unknown until the end)
2. PGG (only treatment group, simultaneous setting, A/NA)
3. TG2 (full sample, strategy method)

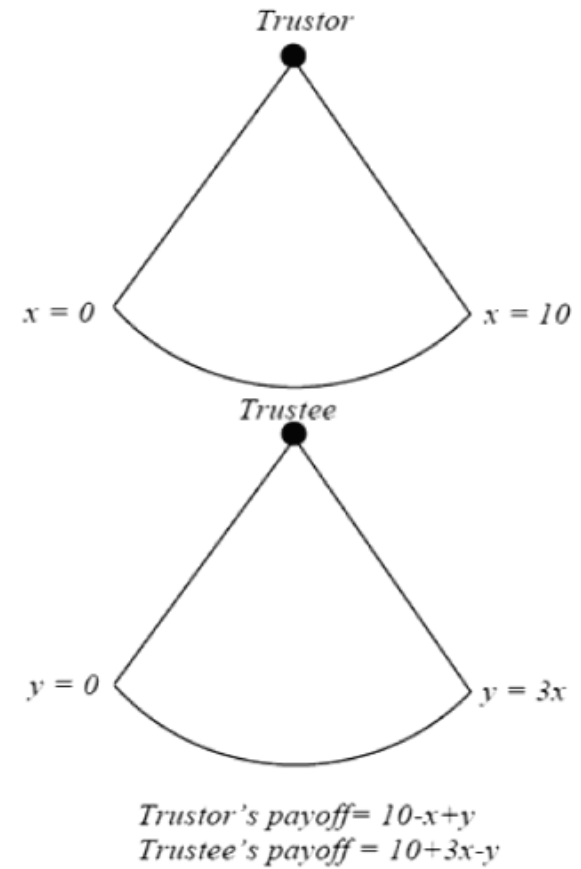


Successful management of common pool resources vs tragedy of the commons

- An interesting application of our experiment is related to the management of common pool resources
- According to established theoretical and empirical evidence (Olmstrom, 1990 and 2000) the first principle which makes the difference between a “tragedy of the common” and a well managed self-organised resource regime is a boundary rule (i.e. a small core group of users who identify each other)
- Such successful resource regimes depend on large part from endogenous levels of trust and reciprocity

The trust games

- Standard two-player investment games (see Berg, Dickhaut and McCabe, 1995)
- Players are matched with a counterpart of unknown identity
- Trustors receive 50 Kenyan shillings and have to decide how much to give to the counterpart (trustee), knowing that this value gets tripled
- Trustees receive as well an initial endowment of 50 Ksh and have to decide ex-ante, without knowing the amount sent by the trustor, how much to give back to the first player
- The use of this “strategy method” allows carrying on the experiment in a non-simultaneous framework without any loss of information about the trustee’s



The Public good game

- Target: replicate the *harambee* situations, that is, the private provision of public goods experienced in daily life in Nairobi (Greig and Bohnet, 2008)
- Players face a trade-off between individual and collective benefits
- 76 groups of four people each (304 people in total) who sit in a circle around a pile of 600 KSh (€ 6.18 in the month of the experiment)
- Participants can withdraw any amount between 0 and 150 KSh from the pile and keep it, the amount left being doubled and divided equally
- In order to control for public approval/fear of punishment half of the sample, 38 out of the 76 groups, plays the game in its anonymous version

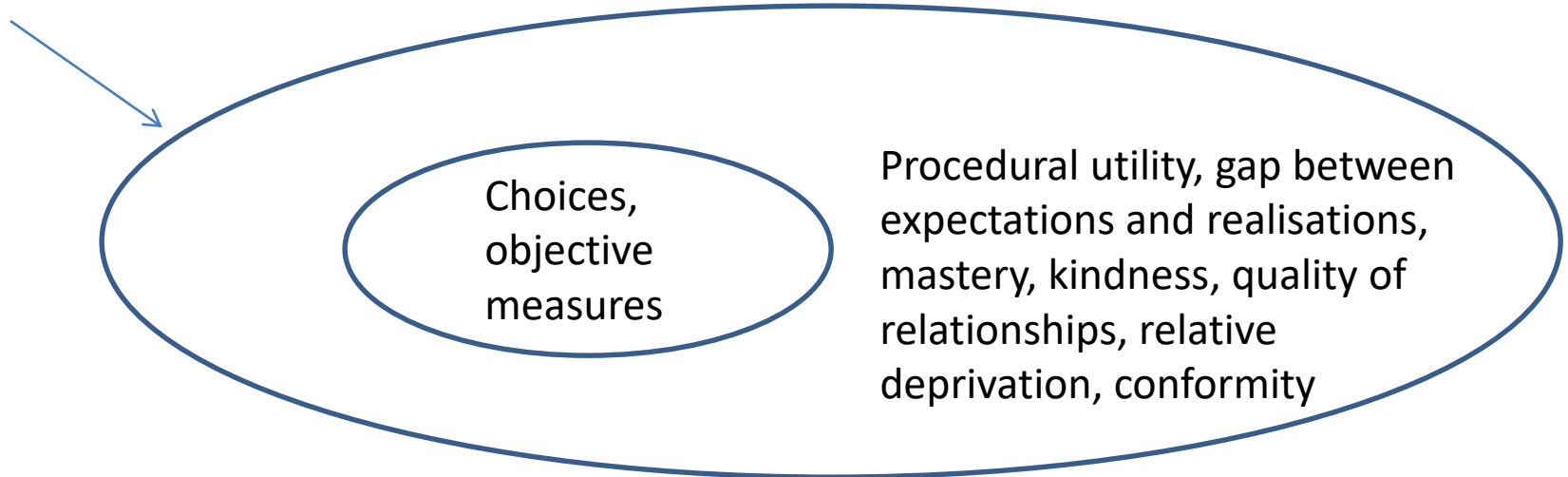
Payoff of the PGG

- In order to replicate a simultaneous setting each player writes down on a sheet how many KSh he/she wants to withdraw
- Then, experimenters make the calculations and write down the individual payoffs = withdrawn amount + $\frac{1}{4}$ of the common capital (the money left by all players multiplied by two)
- The PGG is repeated five times, but the number of rounds is known only to experimenters
- Players are informed at the beginning of the game that they will be paid just for one randomly-chosen round

The hypothesis we test

- Subjective PGG satisfaction is a more comprehensive measure than standard objective measures
- Subjective PGG satisfaction has a stronger predictive power on changes in social capital

Satisfaction



How do we deal with endogeneity

- A subjective evaluation of the experiment treatment such as PGG satisfaction cannot be randomized ex ante
- Therefore, it may be argued that a third driver may affect the observed correlation between satisfaction itself and changes in social capital
- For this reason in our experiment we control for endogeneity by:
 - (i) randomizing ex-ante the participation to the PGG/placebo treatment;
 - (ii) looking at changes in trustworthiness between the two TG rounds, that is, by eliminating the effect of time invariant idiosyncratic components by use of first differences;
 - (iii) controlling ex-post that balancing properties on observable characteristics are met between more and less PGG satisfied ;
 - (iv) providing a sensitivity analysis on propensity score results which relaxes the conditional independence assumption and evaluates whether our main findings are robust to the introduction of “killer” and reasonable confounder

Descriptive statistics of socio-demographic variables, full sample

- Participants to the experiment are very young and their gender is balanced
- The majority of them are single
- Average schooling years are eleven
- U unemployment rate and employment in the informal sector are high
- Several ethnic groups living in the same district
- Half of the sample volunteers more than once a month and/or is member of a microfinance institution.
- Impatience, risk and **betrayal aversion** are frequent psychological attitudes

Descriptive statistics of TG variables

- The amount given by the trustor is roughly the same in the first and second trust game and is around 25 Ksh
- On average the change from the first to the second session is zero ...
- ... but ranges from -30 to +45 with a standard deviation equal to 8.61

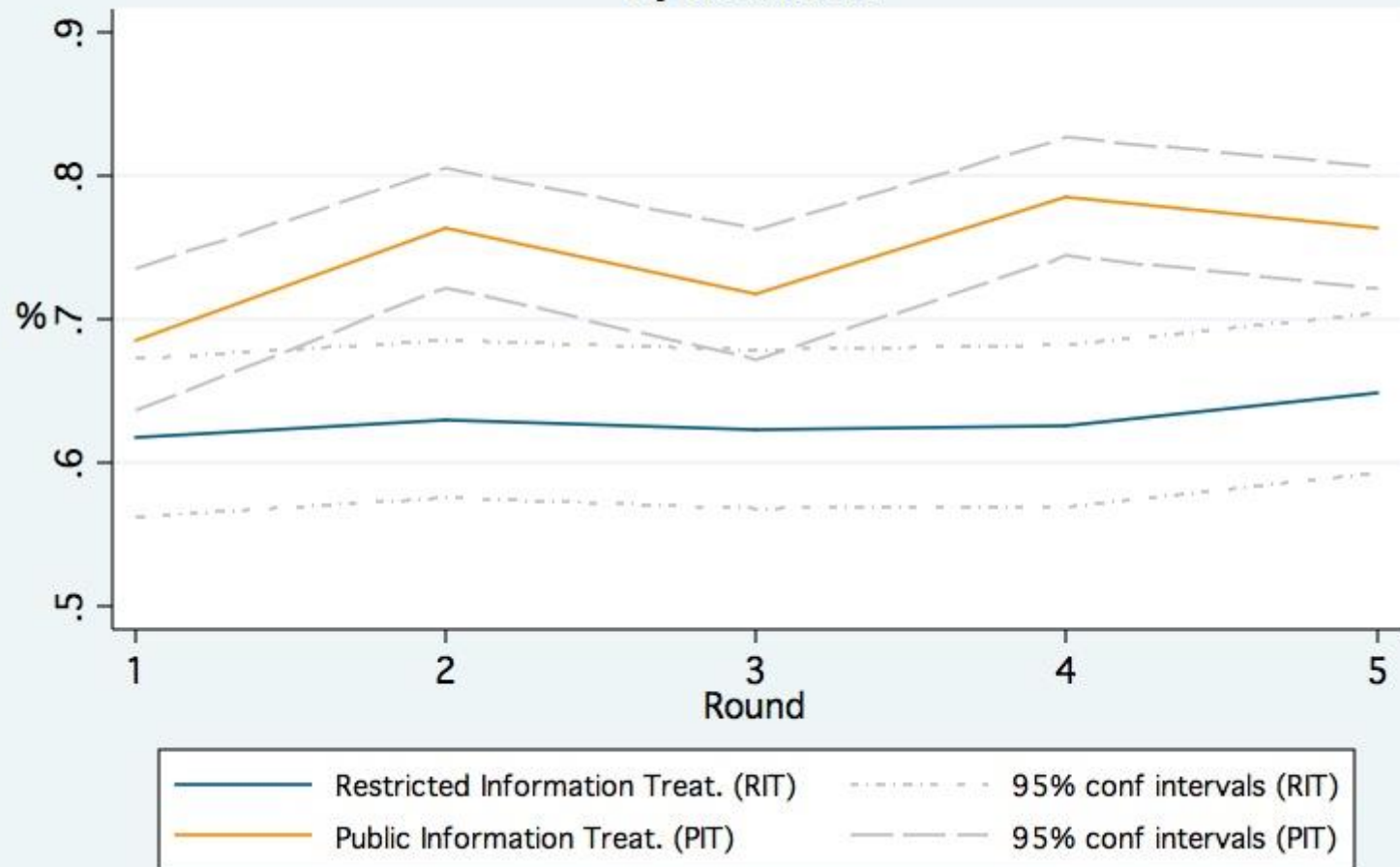
Descriptive statistics of PGG variables

- During the five sessions of the public good game players on average withdraw 69 percent of their money from the common pile, ranging from a minimum of 23 to a maximum of 97 percent
- The difference between the amount withdrawn by the player and the average of his group is, by definition, on average equal to zero ...
- ... but varies significantly (standard deviation equal to 26.63)

Satisfaction about other players' behavior in the PGG

- Ranges from a minimum of one (not at all satisfied) to a maximum of five (very satisfied)
- We aggregate the five classes into three categories, the maximum being satisfied (score four or five), followed by pretty satisfied (score three) and not satisfied (score one or two)
- The level of satisfaction about the outcome of the public good game is high, since 70 percent of players declares themselves satisfied, 19 percent pretty satisfied and only 11 percent not satisfied

Average Withdrawal Ratio by treatment



The Common Pool Resource game results

- Divergence of average withdrawal rates across time with an increasingly lower cooperation in the non anonymous setting.
- Asymmetric informed conformism contributes to explain what we observe, that is, players who contribute more than the group in the previous round react more negatively when individual payoffs are disclosed than when they are not, and their reaction is less than compensated by the mean reversion of those who contributed less.
- Results consistent with the (Omstrom, 2000) hypothesis that, in absence of punishment, disclosure of information about individual (cooperative or non cooperative) behaviour makes common resource management more difficult and tragedy of the commons easier.

[illegible]

Balancing properties: non parametric tests for the difference in mean

1. Socio-demographic variables between treatment and placebo:
 - No significant differences between the two groups, apart from educ (11.9 vs 11.03) and juakali (0.40 vs 0.65)
2. Socio-demographic variables between groups of different happiness:
 - When comparing satisfied versus the rest of the sample we find that the former are younger and married in a much higher proportion
 - When comparing satisfied and pretty satisfied versus non satisfied we find that the latter are more risk averse, less betrayal averse, have higher propensity to volunteer and higher food expenditure per day
3. Trustees' contribution for different satisfaction w.r.to the PGG (T3b):
 - No difference in trustworthiness in the TG1 between satisfied and not satisfied
 - Change in trustworthiness (ΔTG) bigger for satisfied trustees

Non-parametric tests. Average trustees' contributions

		TG1		ATC	
		0	1	0	1
Very sat. (1) vs rest of sample (0)	<i>Obs</i>	47	105	47	105
	<i>Mean</i>	43.91	40.56	-5.85	0.33
	<i>Non-par test (z, p)</i>	1.81	0.07	-2.09	0.04
Very sat. (1) vs not sat. (0) (excluding pretty sat)	<i>Obs</i>	47	105	23	105
	<i>Mean</i>	43.91	40.56	-10.34	0.33
	<i>Non-par test (z, p)</i>	1.81	0.07	-2.11	0.03
Very and pretty sat. (1) vs rest of sample (0)	<i>Obs</i>	23	129	23	129
	<i>Mean</i>	44.55	41.06	-10.34	-0.02
	<i>Non-par test (z, p)</i>	0.79	0.43	-2.06	0.04
Not sat. (1) vs rest of sample (0)	<i>Obs</i>	130	22	130	22
	<i>Mean</i>	40.96	45.33	-0.02	-10.81
	<i>Non-par test (z, p)</i>	-1.06	0.29	2.10	0.04

Non-parametric tests: conditional contributions

		Very satisfied (1) vs rest of sample (0)			Very sat. (1) vs No sat. (0) (excl. Pretty sat.)			Very and Pretty sat. (1) vs. rest of sample (0)		
	<i>Group</i>	<i>Obs.</i>	<i>Mean</i>	<i>z, p</i>	<i>Obs.</i>	<i>Mean</i>	<i>z, p</i>	<i>Obs.</i>	<i>Mean</i>	<i>z, p</i>
<i>Tr Send 5</i>	0	47	-2.28	-0.84	23	-2.30	-1.10	23	-2.30	-1.14
	1	105	-2.59	0.40	105	-2.59	0.27	129	-2.52	0.25
<i>Tr Send 10</i>	0	47	-4.47	-4.49	23	-5.74	-3.77	23	-5.74	-3.43
	1	105	-0.69	0.00	105	-0.69	0.00	129	-1.16	0.00
<i>Tr Send 15</i>	0	47	-4.93	-3.32	23	-7.00	-3.11	23	-7.00	-2.96
	1	105	0.57	0.00	105	0.57	0.00	129	-0.09	0.00
<i>Tr Send 20</i>	0	47	-6.34	-3.44	23	-9.87	-3.16	23	-9.87	-2.94
	1	105	1.65	0.00	105	1.65	0.00	129	0.79	0.00
<i>Tr Send 25</i>	0	47	-7.12	-3.75	23	-10.87	-3.18	23	-10.87	-2.87
	1	105	1.67	0.00	105	1.67	0.00	129	0.70	0.00
<i>Tr Send 30</i>	0	47	-9.96	-3.53	23	-13.43	-2.42	23	-13.43	-2.01
	1	105	1.68	0.00	105	1.68	0.02	129	0.13	0.04
<i>Tr Send 35</i>	0	47	-7.62	-1.65	23	-13.70	-1.47	23	-13.70	-1.35
	1	105	-0.95	0.10	105	-0.95	0.14	129	-1.10	0.18
<i>Tr Send 40</i>	0	47	-6.06	-1.33	23	-13.65	-1.38	23	-13.65	-1.32
	1	105	0.65	0.18	105	0.65	0.17	129	0.75	0.19
<i>Tr Send 45</i>	0	47	-5.76	-0.76	23	-13.11	-0.89	23	-13.11	-0.85
	1	105	1.63	0.45	105	1.63	0.37	129	1.57	0.39
<i>Tr Send 50</i>	0	47	-4.00	-0.13	23	-13.70	-0.75	23	-13.70	-0.83
	1	105	-0.29	0.90	105	-0.29	0.45	129	0.75	0.40

Econometrics: baseline regression (placebo included)

- Methodology: OLS with clustered robust standard errors
- Dependent variable (ΔTG) : change in average trustee's contribution from TG1 to TG2
- Regressors: socio-demographic and experimental variables
- Socio-demographic variables: only food expenditure and risk aversion (at 10%) are significant
- Negative correlation with TG1 and being placebo
- No effect of anonymity and nr of known players in the PGG

Table 5a: Baseline regression, full sample (placebo included)

Regressor	Coef.	t	Coef.	t
Constant	22.84	2.53	19.14	5.07
Age	-0.17	-1.09		
Female	1.31	0.81		
Married	0.90	0.49		
Widowed	3.20	0.72		
Separated	1.23	0.36		
Years of schooling	-0.09	-0.25		
House members	-0.28	-0.72		
Food expenditure day	0.02	2.33		
Unemployed	1.85	0.92		
Kikuyo	-3.55	-1.16		
Luo	1.02	0.42		
Lubian	-4.43	-1.27		
Luhya	0.40	0.16		
Muslim	2.30	0.73		
Mfi	-0.27	-0.15		
Volunteer	1.31	0.74		
Risk averse	-3.50	-1.87		
Betrayal averse	-3.31	-1.36		
Impatient	0.72	0.46		
TG1	-0.51	-5.52	-0.48	-5.21
PGG NA	0.21	0.11	-0.23	-0.12
Friends	-0.70	-0.67	-1.05	-0.98
Placebo	-4.65	-2.19	-3.32	-1.83
N	201		202	
R2	0.4132		0.3405	

Econometrics: effect of PGG, only treatment sample

- Previous results on TG1, anonymity and known PGG players
- Ethnic fragmentation not significant, gender weakly
- PGG individual and group withdrawal ratios are not significant
- PGG satisfaction has a strong (8 Ksh) and significant effect on the change in trustworthiness
- Subjective measures of PGG outcome matter, objective do not

Table 5b: Effect of PGG individual and group withdrawal ratios, only treatment sample

Regressor	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
TG1	-0.48 (-5.29)	-0.47 (-5.16)	-0.46 (-5.45)	-0.46 (-5.42)	-0.47 (-4.80)	-0.46 (-4.63)	-0.45 (-4.89)	-0.45 (-4.91)
PGG NA	0.55 (0.25)	1.10 (0.53)	1.86 (0.97)	1.84 (0.93)	-0.92 (-0.44)	-0.43 (-0.21)	0.42 (0.23)	-0.03 (-0.02)
Friends	-1.11 (-1.03)	-1.07 (-0.99)	-1.02 (-1.00)	-1.01 (-0.99)	-1.04 (-0.96)	-0.98 (-0.90)	-0.95 (-0.88)	-0.94 (-0.86)
PGG Withdrawal ratio	-2.32 (-0.37)	-2.73 (-0.43)		-2.63 (-0.43)	-5.20 (-0.85)	-5.51 (-0.90)		-4.82 (-0.81)
PGG Group withdrawal ratio	5.09 (0.70)	4.24 (0.57)		1.91 (0.25)	10.02 (1.37)	9.67 (1.30)		7.68 (1.01)
Ethnic fragmentation		-2.43 (-0.33)	0.09 (0.01)	0.27 (0.04)		-2.85 (-0.51)	-1.51 (-0.26)	-1.89 (-0.32)
Gender fragmentation		-14.34 (-1.66)	-14.56 (-1.64)	-14.97 (-1.71)		-13.92 (-1.78)	-13.16 (-1.74)	-13.05 (-1.69)
PGG Satisfied			8.61 (2.49)	8.63 (2.43)			8.53 (2.63)	8.32 (2.54)
PGG Pretty Satisfied			8.39 (2.49)	8.45 (2.47)			8.14 (2.26)	7.95 (2.19)
Socio-dem. Controls	Yes	Yes	Yes	Yes	No	No	No	No
N	151	151	151	151	152	152	152	152
R2	0.4558	0.4672	0.504	0.5051	0.3583	0.3714	0.4072	0.4123

Table 6. Trustees' conditional responses for each of the possible trustor contributions

Regressor	TR send 5	TR send 10	TR send 15	TR send 20	TR send 25	TR send 30	TR send 35	TR send 40	TR send 45	TR send 50
Constant	5.53 (1.87)	7.80 (1.67)	7.22 (1.00)	10.63 (1.31)	3.51 (0.46)	15.81 (1.42)	9.50 (0.84)	3.79 (0.35)	15.08 (1.29)	31.52 (1.96)
TG1	-0.72 (-9.25)	-0.59 (-5.47)	-0.45 (-3.77)	-0.44 (-4.28)	-0.43 (-4.61)	-0.48 (-4.23)	-0.58 (-5.98)	-0.51 (-5.44)	-0.47 (-5.67)	-0.54 (-6.07)
Ethnic fragmentation	-1.70 (-0.62)	-3.34 (-0.81)	-1.33 (-0.29)	-2.86 (-0.67)	-1.57 (-0.28)	-1.73 (-0.29)	-5.52 (-0.77)	-3.56 (-0.43)	-6.95 (-0.78)	-0.89 (-0.08)
Gender fragmentation	1.23 (0.61)	1.72 (0.79)	2.17 (0.62)	2.26 (0.56)	3.77 (0.94)	-1.24 (-0.17)	6.41 (0.92)	7.52 (1.04)	0.78 (0.09)	-4.29 (-0.39)
PGG Satisfied	1.52 (2.45)	3.81 (3.29)	6.77 (3.64)	9.84 (3.81)	10.47 (3.47)	12.46 (2.98)	10.92 (2.33)	9.69 (1.83)	10.53 (1.85)	8.89 (1.08)
PGG Pretty Satisfied	-0.13 (-0.21)	1.33 (1.14)	3.27 (1.75)	5.10 (1.90)	6.26 (1.93)	6.82 (1.53)	12.80 (2.51)	13.39 (2.19)	13.38 (2.00)	17.96 (1.90)
PGG Withdrawal ratio	-1.15 (-0.55)	-5.38 (-1.35)	-2.96 (-0.73)	-9.84 (-1.61)	-6.14 (-0.94)	-11.66 (-1.25)	6.63 (0.79)	2.60 (0.30)	-10.28 (-0.97)	-9.03 (-0.65)
PGG Group withdrawal ratio	-0.20 (-0.06)	3.52 (0.56)	-3.76 (-0.58)	1.11 (0.12)	6.79 (1.02)	6.02 (0.59)	6.18 (0.48)	16.93 (1.31)	26.95 (1.95)	17.53 (1.00)
N	152	152	152	152	152	152	152	152	152	152
R2	0.62	0.53	0.34	0.35	0.36	0.34	0.43	0.39	0.36	0.36

Robustness checks I

- We repeat the exercise by using as regressors:
 - the difference between individual and group withdrawal ratios in each PGG round
 - the average difference between individual and group withdrawal ratios in the five PGG rounds
 - trust and sociability indexes

- Results hold: subjective measures matter, objective do not

- Trust and sociability indexes do not display any significant effect

Policy implications

- Identifying those individuals who, for the same given observable dynamic of public good activities, are more apt to be positively affected in terms of changes in social capital can be useful
- This identification can be done by extracting (via satisfaction surveys) subjective factors related to the process of creation of public goods
- Suppose that individuals more prone to find positive elements in these processes are properly selected for participation to the crucial processes of creation of public goods in crucial socioeconomic frameworks
- Examples: individuals to be elected in boards of collectively managed commons, in local political institutions, etc.
- Consequence: the learning to trust benefits arising from PGG-like activities may be magnified with positive effects on transaction costs of social and economic relationships at a wider community level

Identification of “bad type” individuals

- Therefore, understanding how public good game activities reinforce or weaken such endogenous levels and identifying individuals for which the relationship is weaker is of fundamental importance
- Such individuals may either be excluded in order to avoid that their violations of reciprocity endangers the successful evolution of social norms or at least may be excluded from key roles in the governance of such processes
- Our sandwich experiment has some special advantages in identifying such individuals since we measure satisfaction from collective action net of its observable outcome which is common to all participants to the PGG game

Policy implications remain also with endogeneity

The qualifying difference between alternative interpretation of our findings (in presence or not of endogeneity) is that:

- (i) if the observed significant change in social capital is produced by the PGG game, situations of that kind significantly affect the creation of human capital for the special kind of (more satisfied or lower expectation) individuals identified in the experiment
- (ii) if, on the contrary, the observed finding depends on unobservable ex-ante invariant components (endogeneity), extraction of satisfaction and expectations is fundamental to isolate more cooperative types

Conclusions

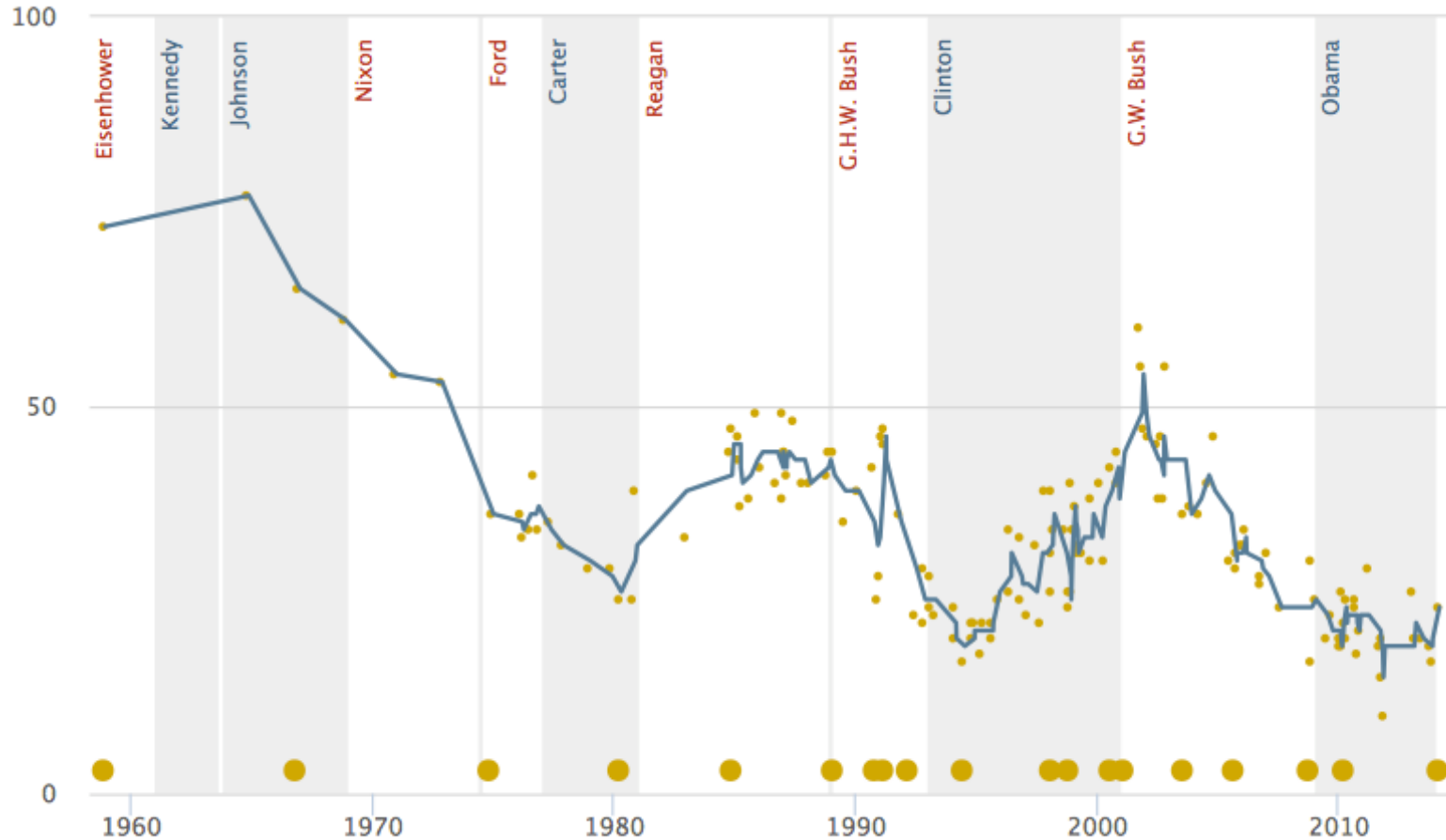
The contribution of the paper is twofold:

1. From an experimental economics viewpoint it documents the superior predictive power of subjective satisfaction versus observable outcomes when measuring the effect of PGG activities on changes in social capital
2. It suggests from a normative viewpoint that satisfaction measures may help to select individuals whose participation to public good activities may maximise effects in terms of social capital creation
3. Our findings support the hypothesis that boundary rules are important to design grass-root management of the commons. They document the validity of a subjective satisfaction based selection rule which may help reinforce links between public good management and endogenous creation of social capital, fundamental to make the governing process self-sustainable.

The Erosion of Trust

25
2

Trust in government (US, 1958-2014)

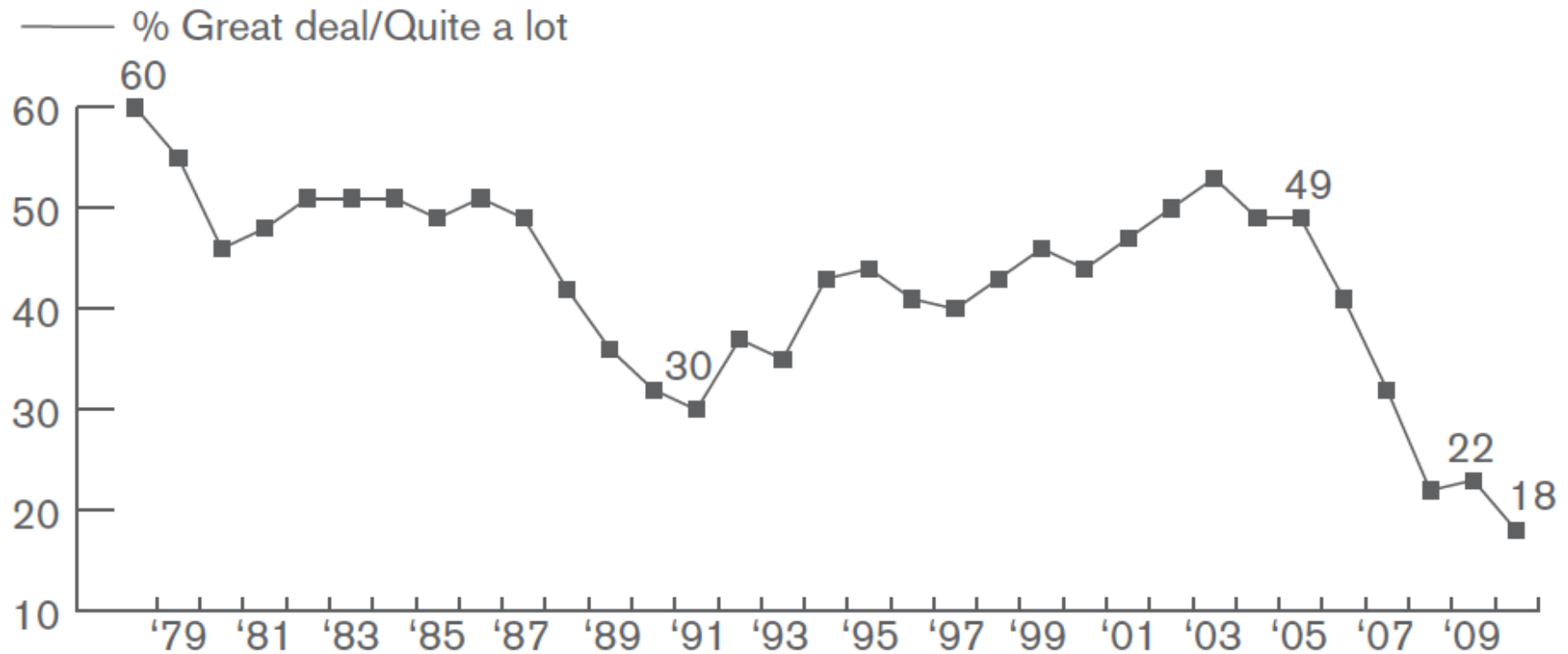


Sources: Pew Research Center (2015)

The Erosion of Trust

25
3

Trust in Banks (US, 1979-2010)

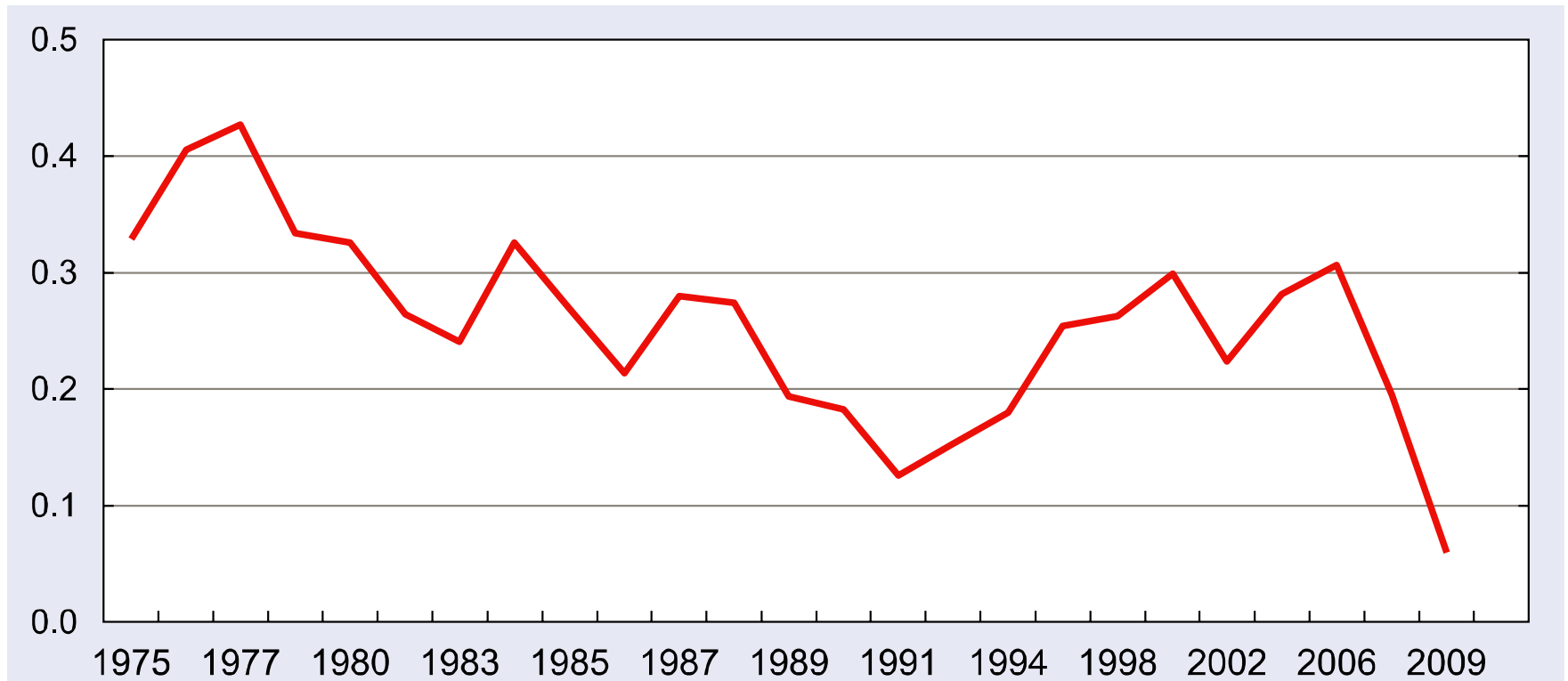


Source: Gallup (2015)

The Erosion of Trust

25
4

Trust in Financial Markets (US, 1975-2009)



Source: US General Social Survey (2010)

The Erosion of Trust

25
5

Trust in the Mass Media (US, 1997-2015)

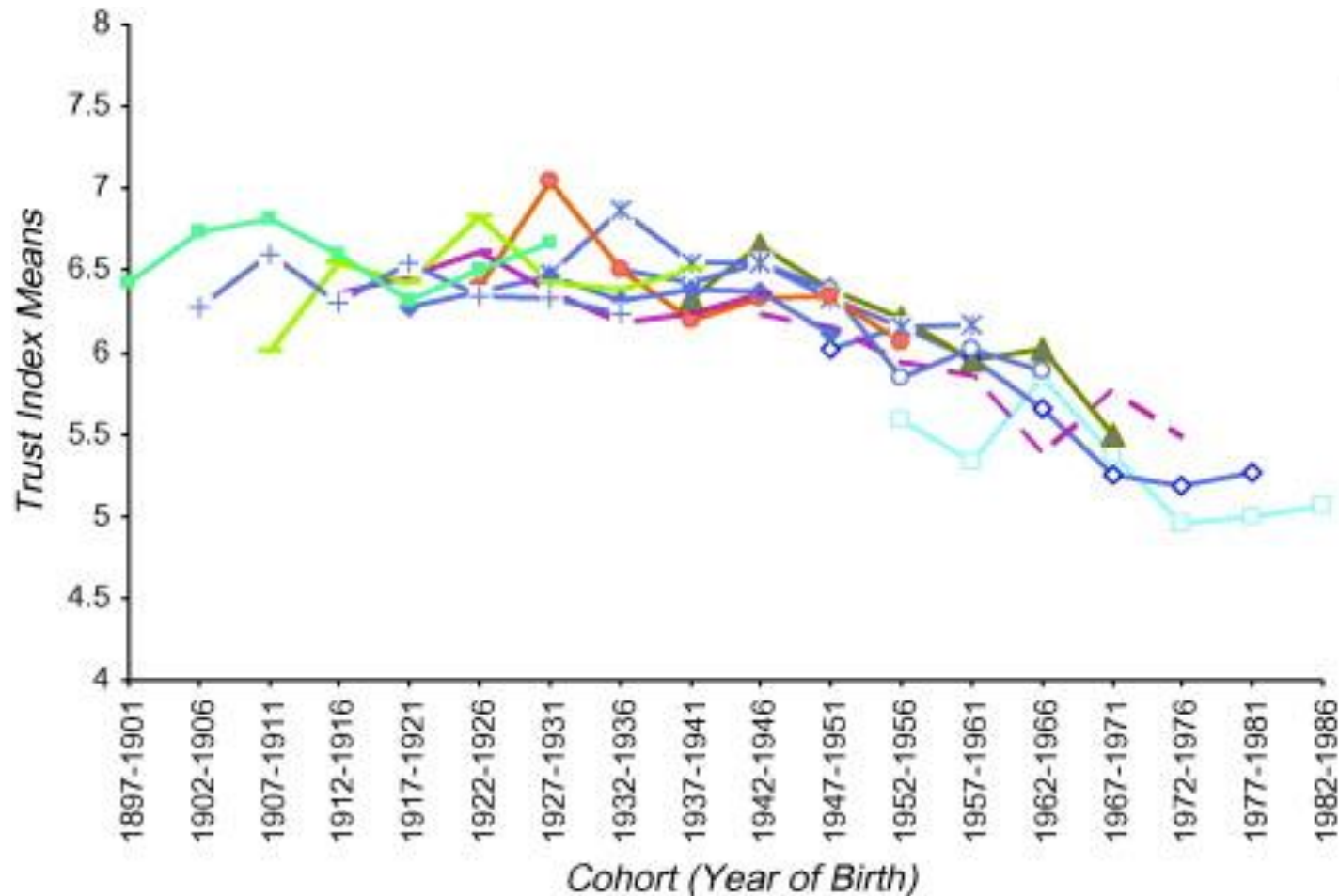


Source: Gallup (2015)

The Erosion of Trust

25
6

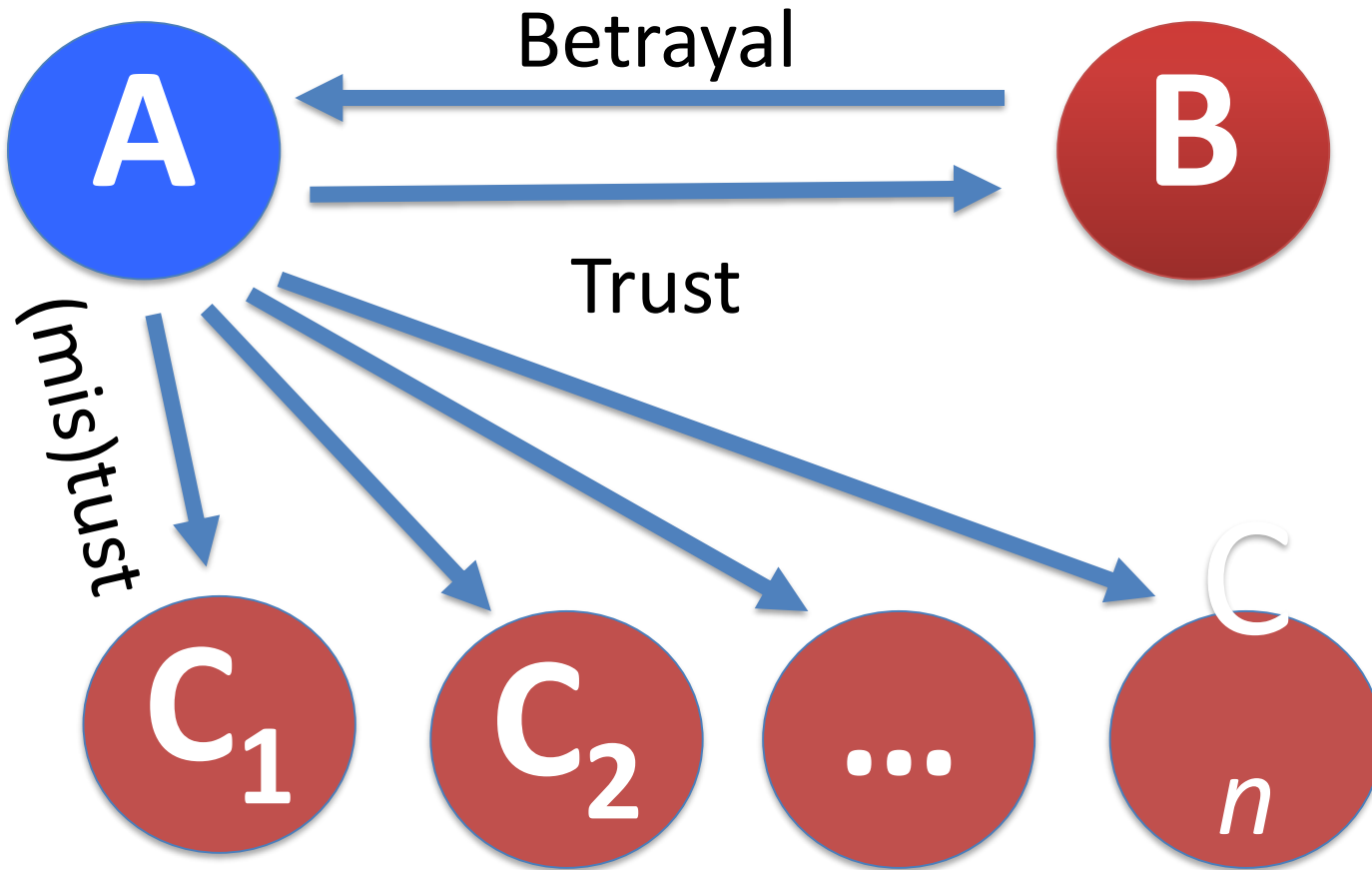
Cohort trends in generalized trust in the US



Source: Clark and Eisenstein (2012)

The Trust Meta-Game (TmG)

25
7



The Trust Meta-Game (TmG)

25
8

The geographical spread of Madoff's victims (USA)

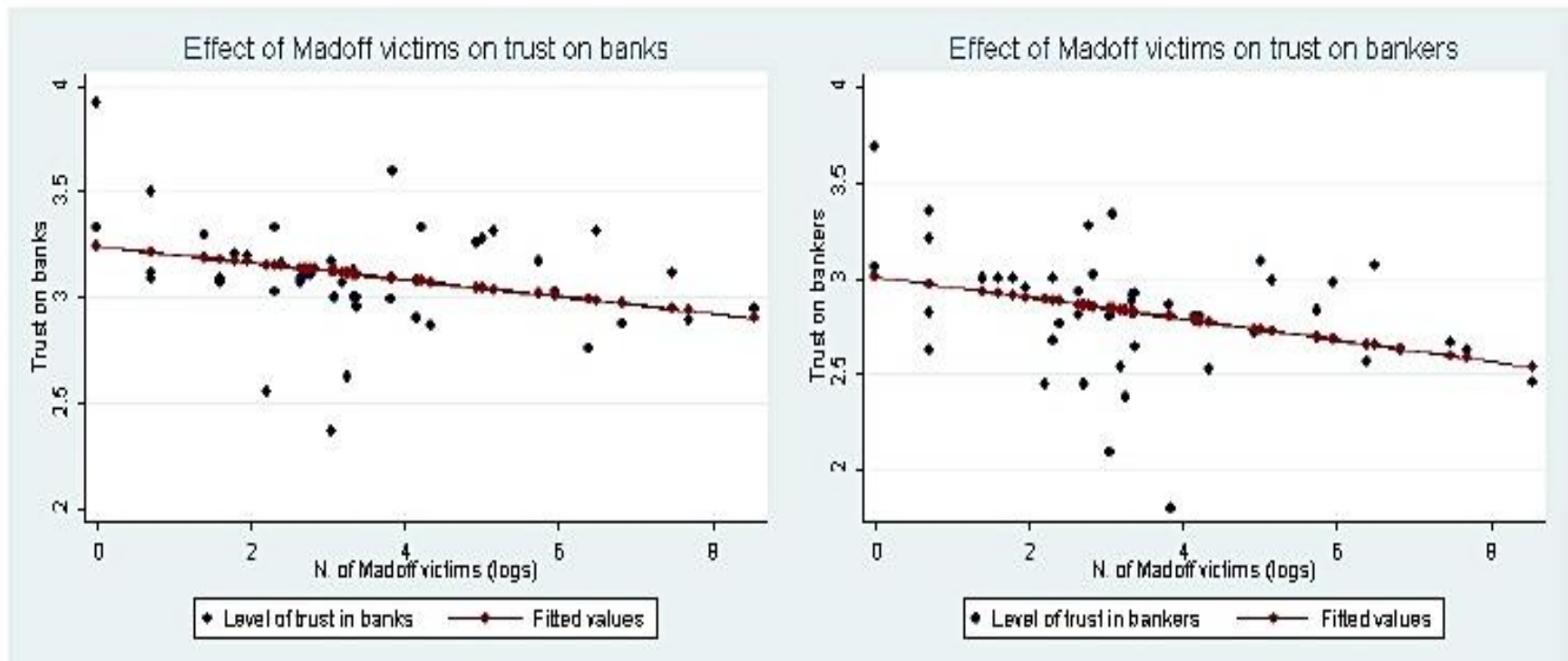


Source: Guiso (2012)

The Trust Meta-Game

25
9

Trust in Banks and Bankers and Density of Madoff's victims



Source: Guiso (2012)

- While opportunism benefits only the trustee, the associated costs affect n other subjects (similar) to the trustee.
- Individual perception of the erosion of trust emerges when is too late.
- “We inhabit a climate of trust as we inhabit an atmosphere and notice it as we notice air, only when it becomes scarce or polluted”

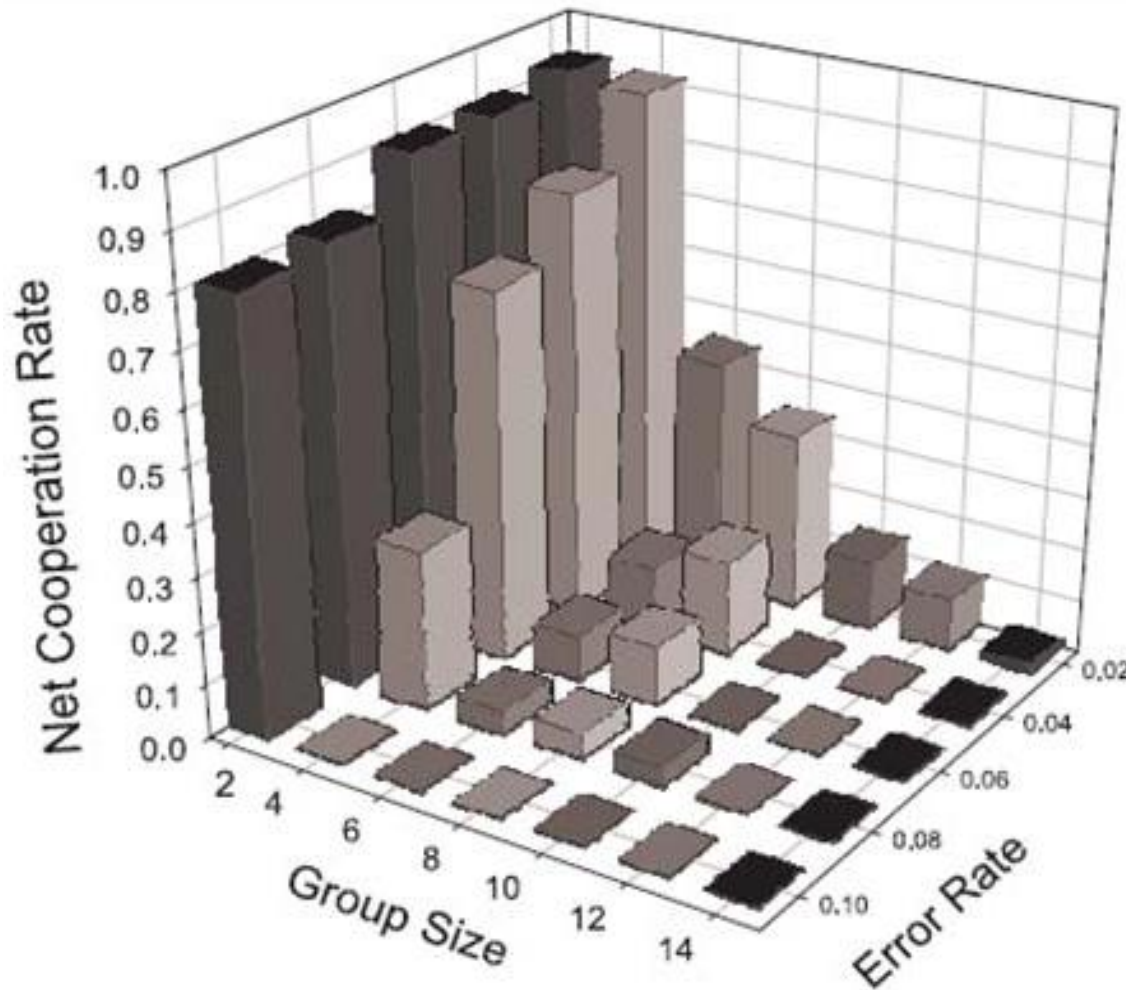
(Baier, 1986. 232).

- Privatize
- Nationalize
- Decentralized common management

Reputation

- When the TG is (indefinitely) repeated there is an incentive to build a reputation of trustworthiness
- That modifies the TmG
- True only in small populations, with perfect monitoring and no errors

How cooperation collapses

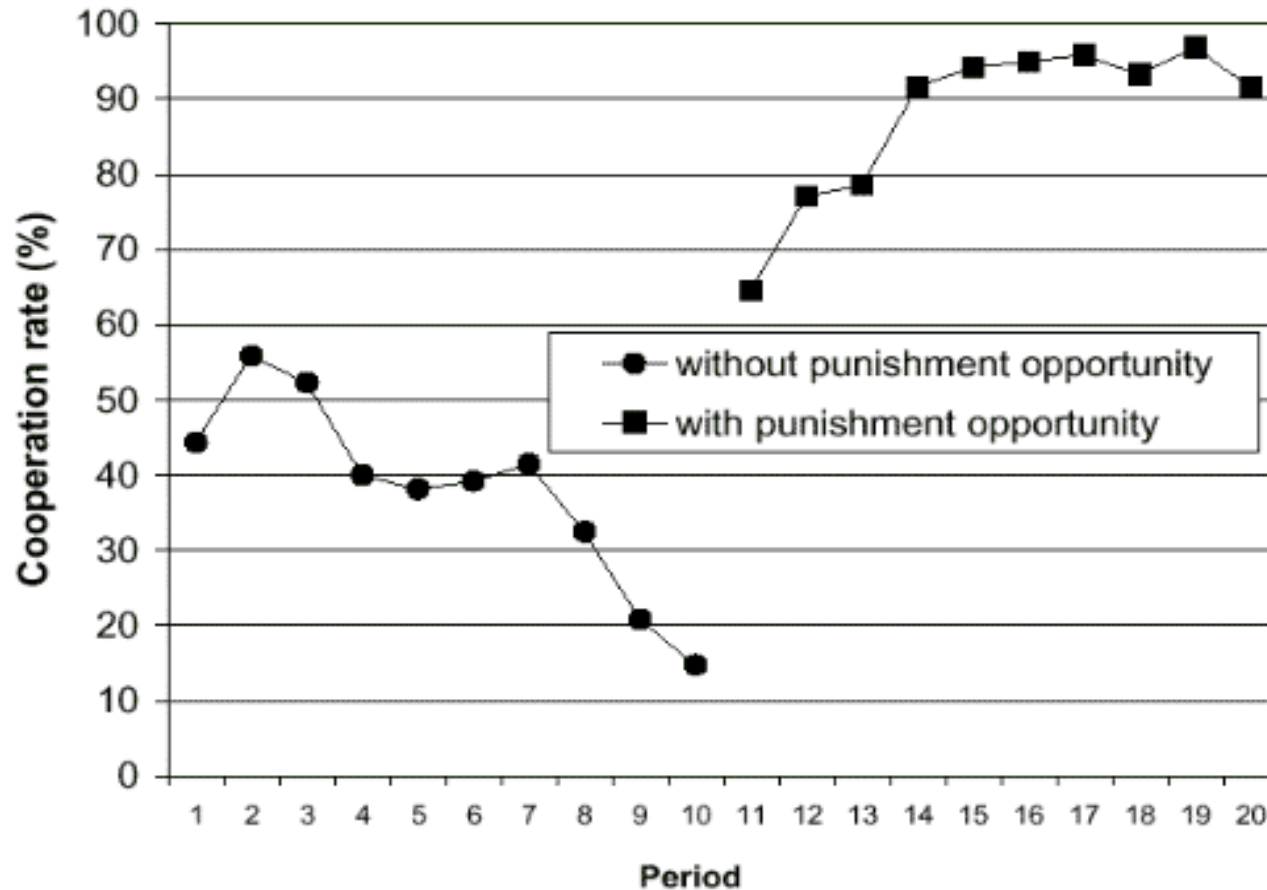


(Source: Bowles, Gintis, 2012)

Strong Reciprocity

- Decentralized monitoring and altruistic punishment
- Shared informal cooperative norms (trustworthiness) can be enforced by costly punishment of the defectors

Cooperation via punishment in the TmG



(Source: Fehr and Gächter, 2000)

Problems with Altruistic Punishment

- Legitimacy
- Counter-punishment, Vendettas and Feuds
- Anti-social punishment

Individual Ethic

- Intrinsic motivations and deontological values
- Individuals may be willing to comply to a norm unconditionally.

Intentionality matters...much more reciprocity when the trustor move is intentional

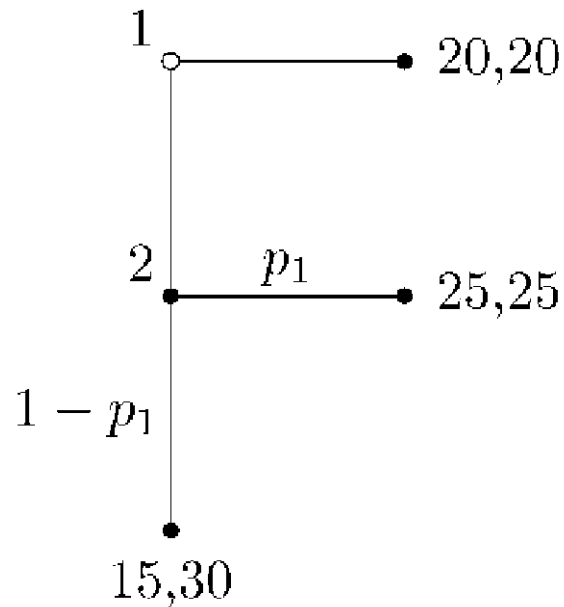


Fig. 1. Voluntary trust game (VTG).

$$p_1 = 64.7\%$$

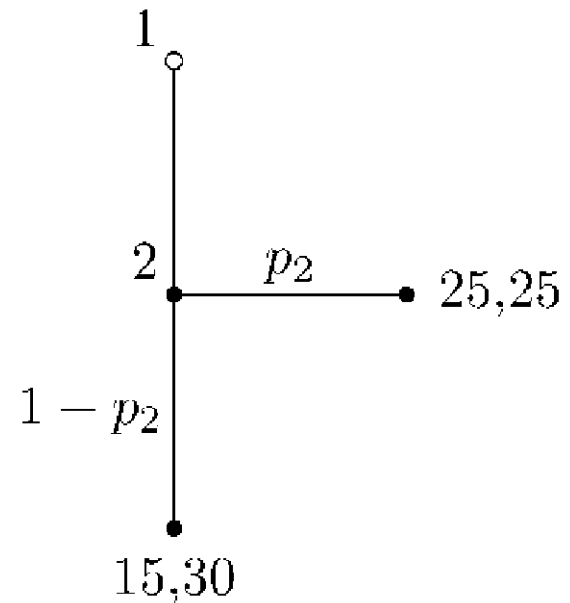


Fig. 2. Involuntary trust game (ITG).

$$p_2 = 33.3\%$$

Fehr, & List, 2004. The hidden costs and returns of incentives, *Journal of The European Economic Association*, 2:5, pp. 743-71.

Two Treatments:

Trust Game (Investment-Game)

Trust Game with Punishment (TWP)

Subjects:

126 students and 76 CEOs

Initial Endowment:

10 Shanks

Trust game

A chooses $x \in \{0, 1, 2, \dots, 10\}$ and $\hat{y} \in \{0, 1, 2, \dots, 3x\}$

B chooses $y \in \{0, 1, 2, \dots, 3x\}$

$$\pi_A(x, y) = 10 - x + y$$

$$\pi_B(x, y) = 10 + 3x - y$$

Trust game with Punishment

A chooses: $x \in \{0, 1, 2, \dots, 10\}$ and $\hat{y} \in \{0, 1, 2, \dots, 3x\}$
fixed fine $f = 4$ if $y < \hat{y}$

B chooses: $y \in \{0, 1, 2, \dots, 3x\}$

$$\pi_A(x, y) = 10 - x + y$$

$$\pi_B(x, y) = 10 + 3x - y \quad (-4)$$

TABLE 1. Comparison of trust and trust with punishment treatment

	Average (over all observations)	
	Trust	Trust with punishment
Transfer (investment) x to the agent	4.0 (2.6) 5.9 (2.3)	5.0 (2.9) 7.3 (2.3)
Desired payback in percent of tripled investment $\hat{y}/3x$	76.9 (41.0) 65.1 (20.5)	69.9 (24.0) 66.1 (23.2)
Actual payback in percent of tripled investment $y/3x$	31.6 (26.3) 44.1 (22.3)	38.7 (33.6) 44.0 (23.3)
Principals' payoff	10.5 (3.0) 11.8 (3.7)	11.0 (4.9) 12.6 (4.9)
Agents' payoff	17.5 (5.9) 20.1 (5.6)	17.4 (7.5) 20.5 (5.1)
Number of observations (pairs)	126 (63 pairs) 76 (38 pairs)	126 (63 pairs) 76 (38 pairs)

Notes: CEO data in bold. Standard deviations in parentheses. Figures are in shanks.

Public Good Game (PGG)

N : number of players

y : individual endowment

g : investment

a : individual rate of return

payoffs:

$$\pi_i = y - g_i + a \sum_{i=1}^n g_i$$

$$0 < a < 1 < na$$

Equilibrium?

Since g is public good it is modelled as being non rivalrous

Simon Gächter & Ernst Fehr, 2000. "Cooperation and Punishment in Public Goods Experiments," *American Economic Review*, vol. 90(4), pp. 980-994.

Experimental Design

Treatments:

- partner/stranger
- no punishment/punishment
- repeated for 20 rounds
- anonymity
- real incentive

Table 1 - Treatment Conditions

	<i>Stranger-treatment</i> <i>Random group composition</i> <i>in each period</i> <i>(Session 1, 2, 3)</i>	<i>Partner-treatment</i> <i>Group composition constant</i> <i>across periods</i> <i>(Session 4 and 5)</i>
<i>Without Punishment</i> <i>(ten periods)</i>	18 groups of size n	10 groups of size n
<i>With punishment</i> <i>(ten periods)</i>	18 groups of size n	10 groups of size n

Payoffs without punishment:

$$\pi_i^1 = y - g_i + a \sum_{j=1}^n g_j \qquad 0 < a < 1 < na$$

Payoffs with punishment (credible?)

$$\pi_i = \pi_i^1[1 - (1/10)P^i] - \sum_{j \neq i} c(p_i^j)$$

After the punishment stage the payoff is reduced by a 10% of the sum of the punishment points received, minus the cost of the punishment.

Table 2 - Punishment levels and associated costs for the punishing subject

punishment points p_i^j	0	1	2	3	4	5	6	7	8	9	10
costs of punishment $c(p_i^j)$	0	1	2	4	6	9	12	16	20	25	30

Figure 1a: Average contributions over time in the Stranger-treatment
(Sessions 1 and 2)

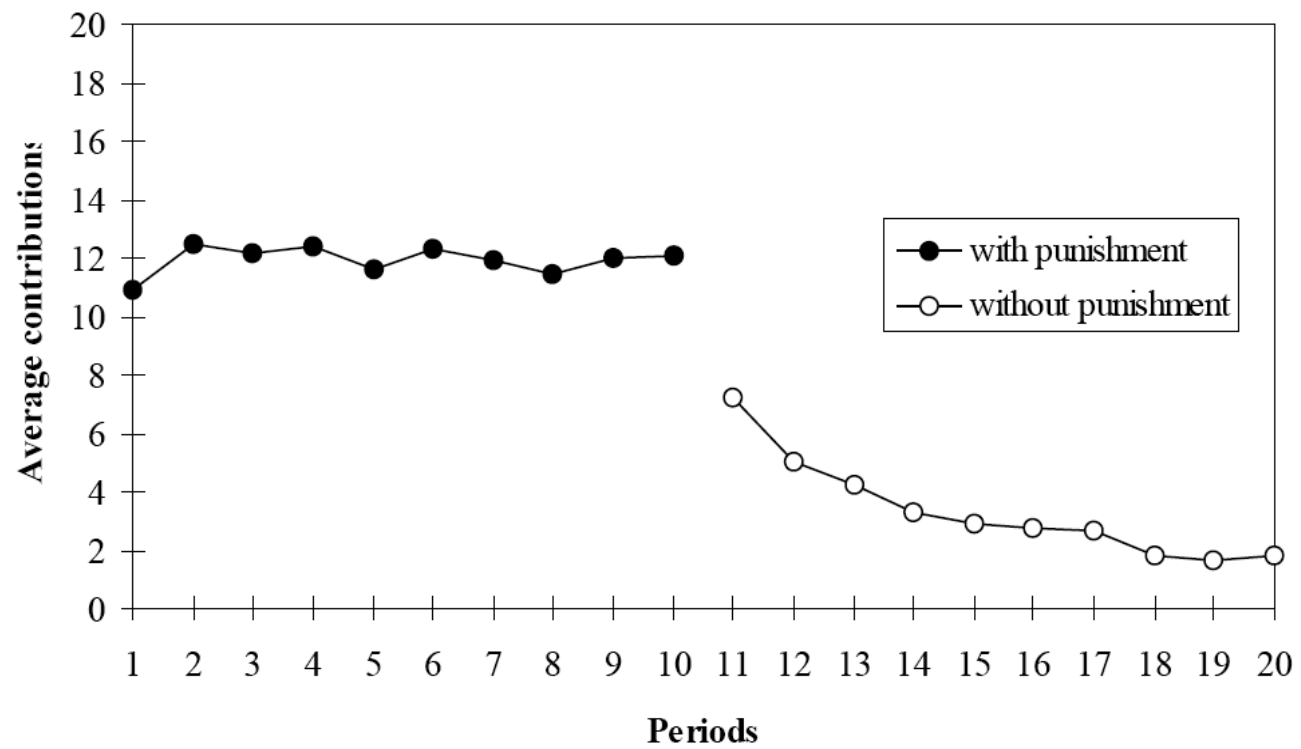


Figure 1b: Average contributions over time in the Stranger-treatment (Session 3)

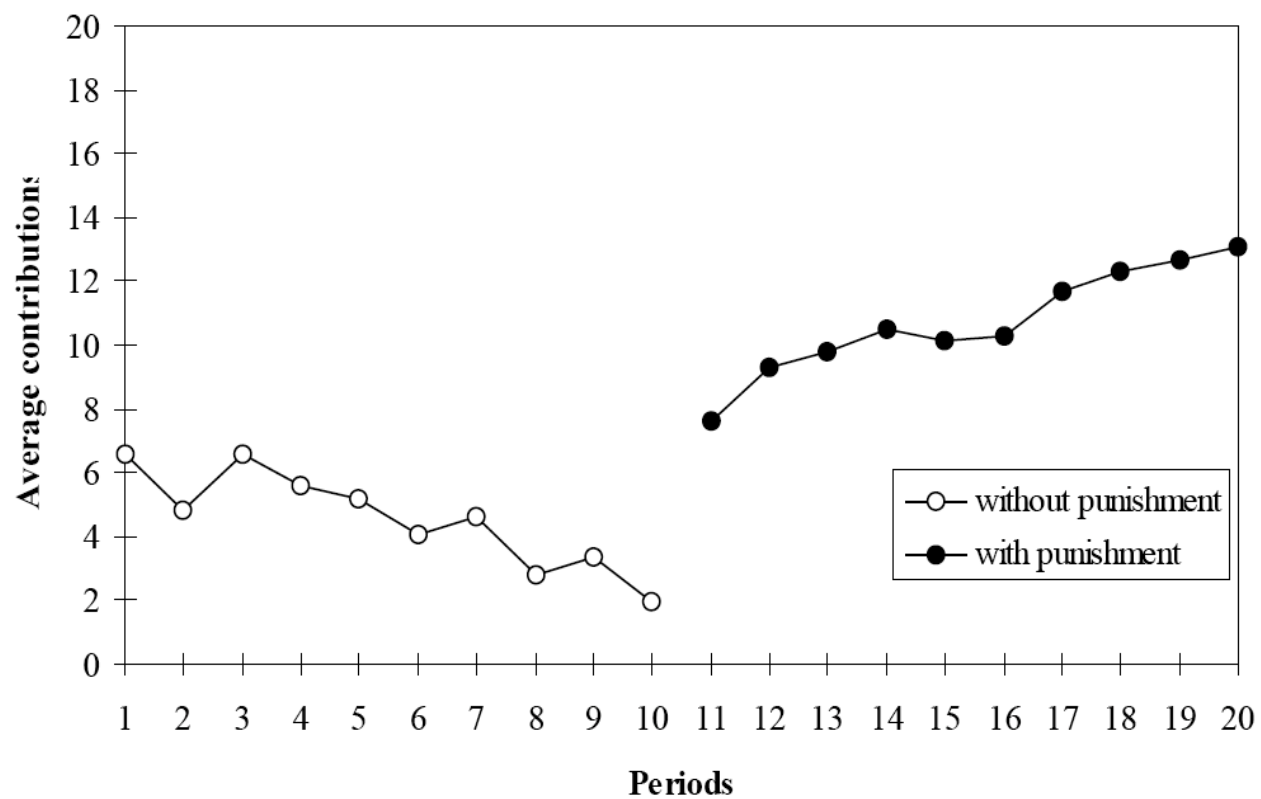


Figure 3a: Average contributions over time in the Partner-treatment
(Session 4)

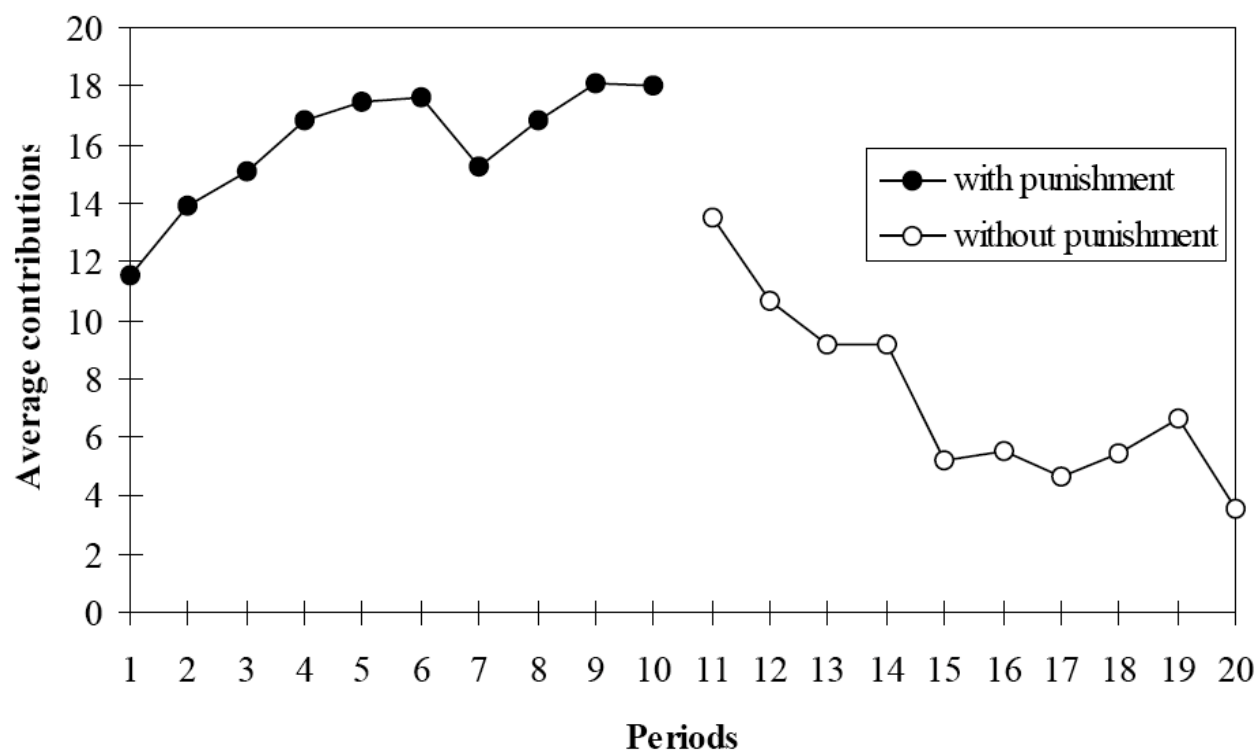
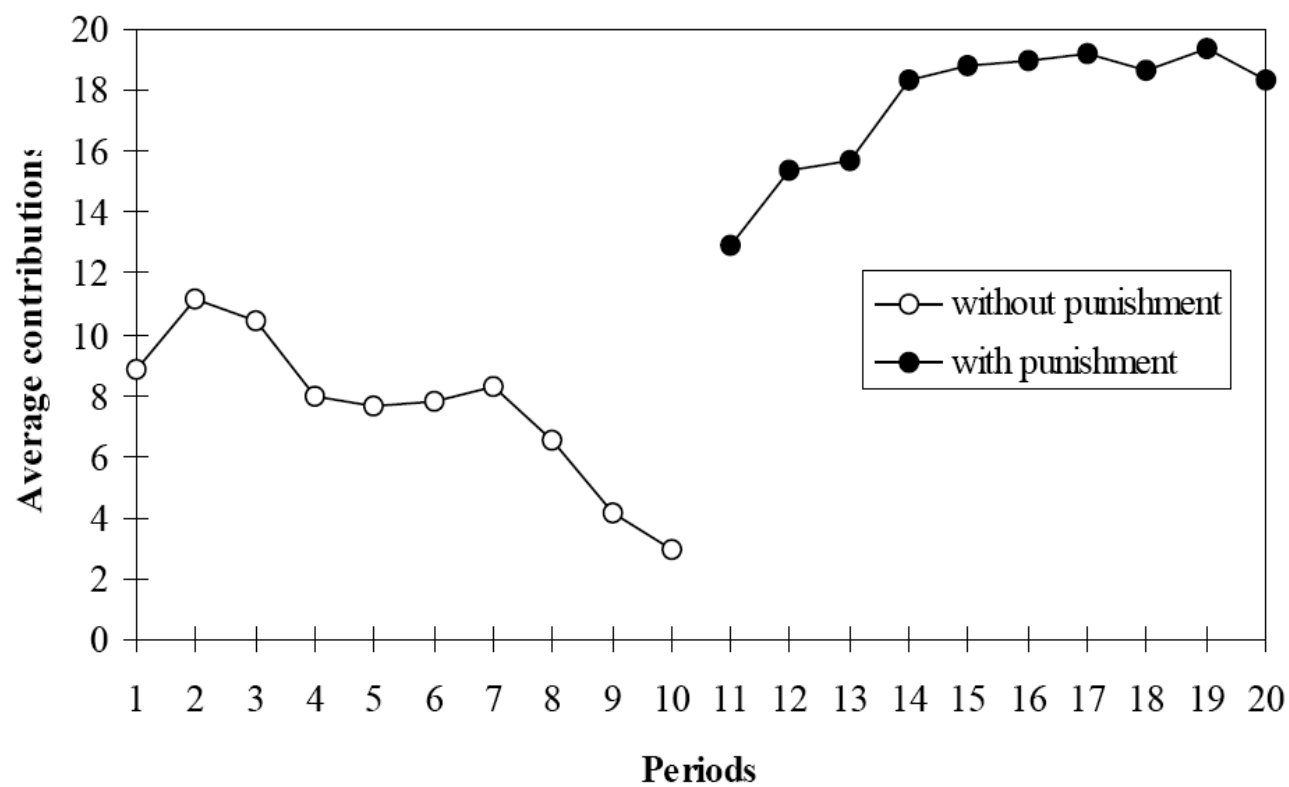


Figure 3b: Average contributions over time in the Partner-treatment
(Session 5)



Result 1: *The existence of punishment opportunities causes a large rise in the average contribution level in the Stranger-treatment.*

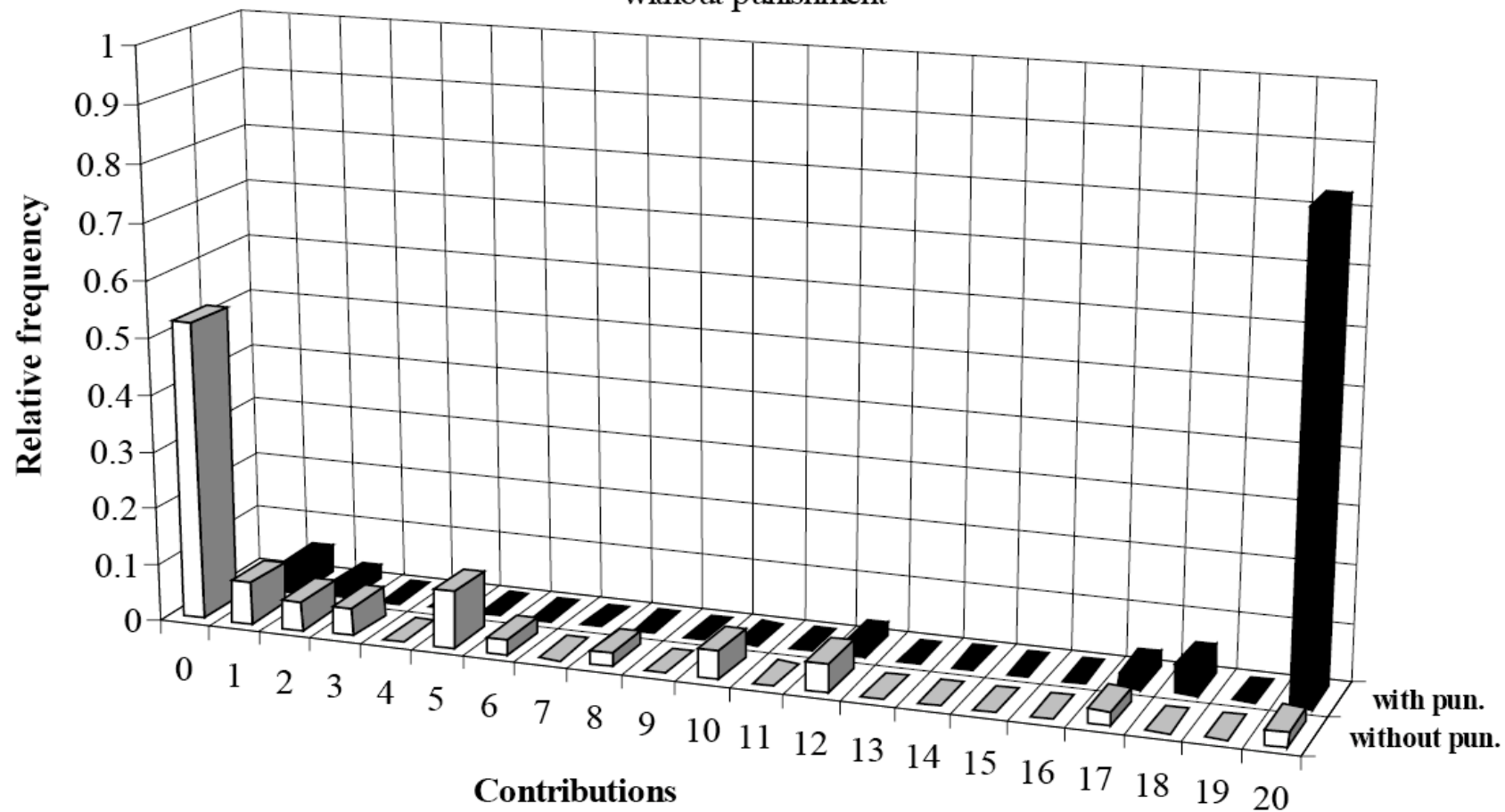
Result 2: *In the no-punishment condition of the Stranger-treatment average contributions converge close to full free riding over time. In contrast, in the punishment condition average contributions do not decrease or even increase over time.*

Result 3: *In the Stranger-treatment with punishment no stable behavioral regularity regarding individual contributions emerges while in the no-punishment condition full free riding emerges as the focal individual action.*

Result 4: *The existence of punishment opportunities also causes a large rise in the average contribution level in the Partner-treatment.*

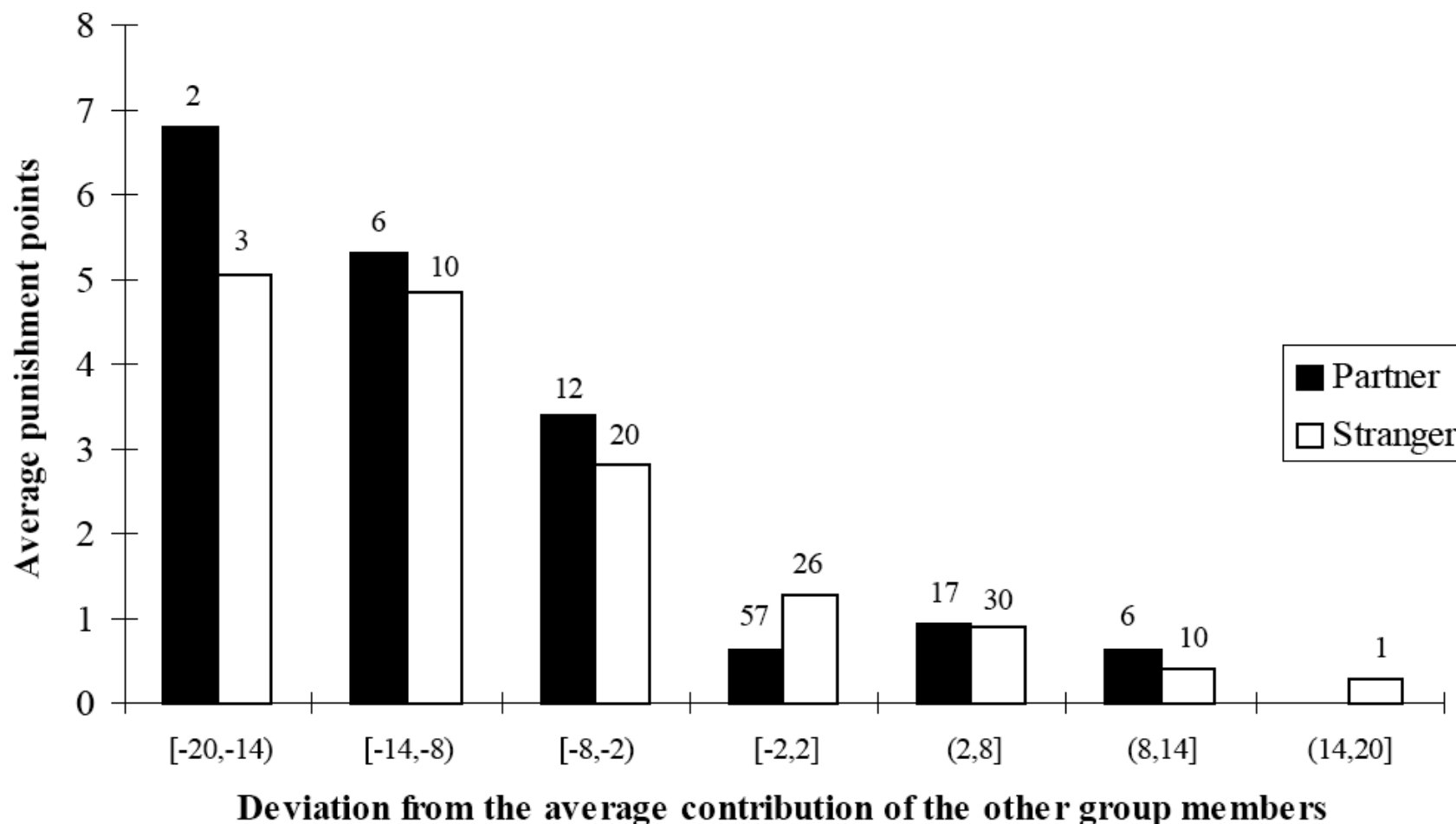
Result 5: *In the no-punishment condition of the Partner-treatment average contributions converge towards full free riding whereas in the punishment condition they increase and converge towards full cooperation.*

Figure 4: Distribution of contributions in the final periods of the Partner-treatment with and without punishment



Result 6: *In the Partner-treatment with punishment, full cooperation emerges as the dominant behavioral standard for individual contributions whereas in the absence of punishment opportunities full free riding is the focal action.*

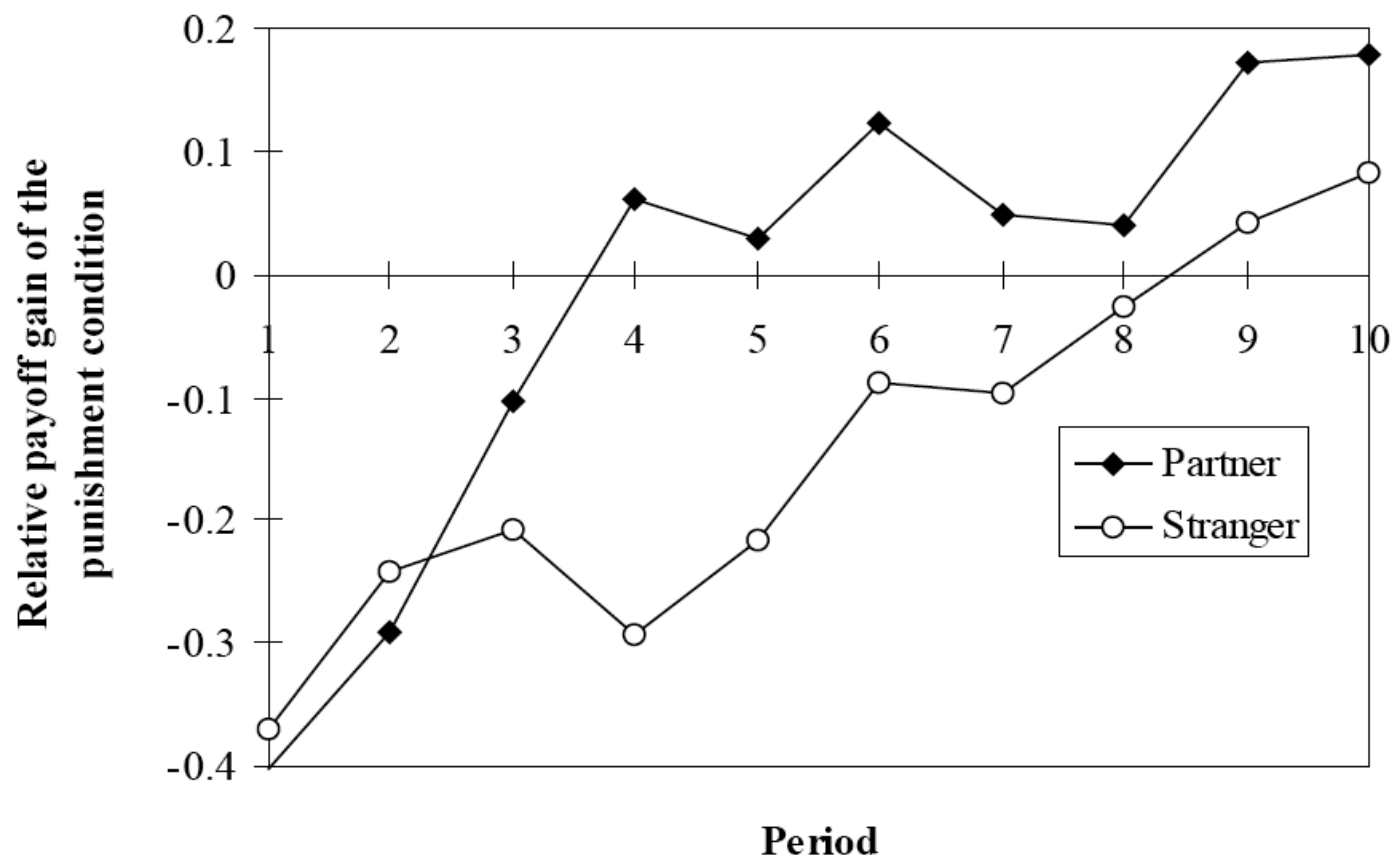
Figure 5: Received punishment points for deviations from others' average contribution



Result 7: *In the Stranger and the Partner-treatment a subject is more heavily punished the more his contribution falls below the average contribution of other group members. Contributions above the average are punished much less and do not elicit a systematic punishment response.*

.

Figure 6: Average payoff gain of the punishment relative to the no-punishment condition



Result 8: *In both the Stranger and the Partner-treatment the punishment opportunity initially causes a relative payoff loss. Yet, towards the end there is a relative payoff gain in both treatments..*

General conclusions.

This paper provides evidence that spontaneous and uncoordinated punishment activities give rise to heavy punishment of free riders. In the Perfect Stranger- and the Stranger-treatment this punishment occurs although it is costly *and* provides no or virtually no future private benefits for the punishers. The more an individual negatively deviates from the contributions of the other group members the heavier is the punishment. Therefore, the punishment opportunity gives rise to credible threats against potential free riders and causes a large increase in contributions: Very high or even *full cooperation* can be achieved and maintained in the punishment condition whereas the *same* subjects converge towards *full defection* in the no-punishment condition. We do not know of many instances in which a variation in the behavioral environment that should - according to the standard economic approach - have no effect, causes such a large behavioral difference. We also provide evidence that

General conclusions

free riding causes strong negative emotions among cooperating subjects. Moreover, the pattern of emotional responses to free riding is consistent with the hypothesis that negative emotions trigger the willingness to punish.

In our view emotion-based punishment of free riding also plays an important role in real life. It seems, for example, rather likely that many drivers feel an impulse to punish those who are butting into line, that - under team production - shirking workers elicit strong disapproval among their peers, and that strike breaking workers face the spontaneous hostility of their striking colleagues. The enormous impact of the punishment opportunities on contributions in our experiment suggests that a neglect of the widespread willingness to punish free riders faces the serious risk of making wrong predictions and, hence, giving wrong normative advice. Institutional and social structures that, theoretically, trigger the same behaviors in the absence of the willingness to punish may cause vastly different behaviors if the willingness to punish is taken into account.

Trust with corruption and crime

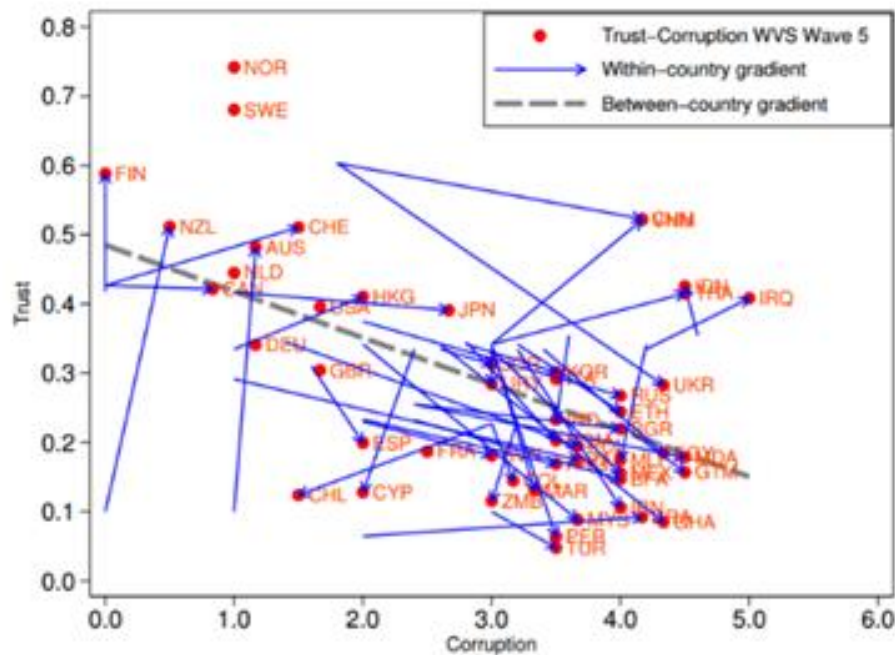


Figure 1: Within and between country gradient between trust and corruption

Note: Arrows indicate the movement of countries in the Trust-Corruption space from Wave 2 to Wave 5 in the World Value Survey. The dotted line shows the cross sectional gradient for Wave 5 in WVS (slope coefficient = -0.07, p -value < 0.01). 68% of the 43 countries that we have data on, have arrows that point to the South East. The OLS regression coefficient, when change in corruption is regressed over change in trust, is -0.024 (p -value = 0.36). These suggest that not only is the cross sectional correlation between corruption and trust negative, but over the period most countries have moved towards higher corruption and this movement has also been associated with lower trust. Data source: Corruption - International Country Risk Guide (ICRG); Trust - World Value Survey. Arrows in some data points are missing as these countries have only one data point each since WVS has brought more and more countries within its fold over time.

Corruption and trust: the direction of causality puzzle

- Generally strong and negative correlation
- Evidence on the direction of the causal link between corruption and trust is however at best mixed....
- Low levels of trust in a society may favor corruption because of the widespread sense of opportunism (LaPorta et al., 1997; Bjornskov, 2011; Moreno, 2002; Seligson, 2002).
- Lack of trust may generate the perception of high levels of corruption (Rotondi and Stanca, 2015), that in turn renders corruption more acceptable and likely to occur (Bardhan, 1997; Innes and Mitra, 2013).
- Corruption as one of the driving forces behind the erosion of trust (Anderson and Tverdova, 2003; Chang and Chu, 2006; Della Porta, 2000).
- Circular causality : corrupt officials and business people tend to illegally appropriate an undue share of resources, making, in this way, the rich even richer. So, corruption fuels inequality, which leads to lower trust and even more corruption (Uslaner, 2008) (Uslaner, 2008).

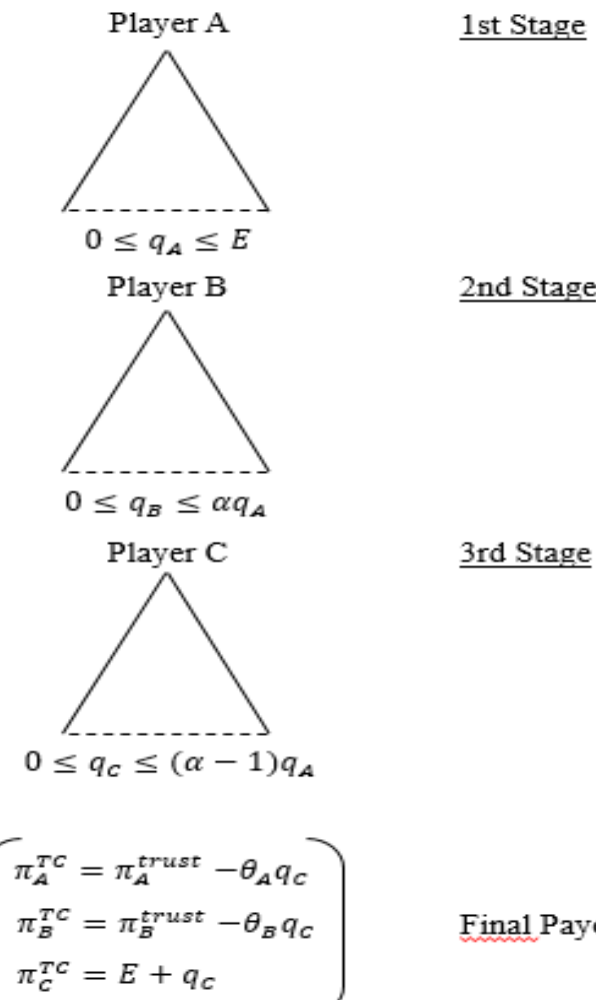
Corruption and trust in experiments

- Banerjee (2016).
- FIRST STAGE
Participants play first either a harassment bribery game, or a strategically equivalent ultimatum game. These games mimic a situation where extortion is an option.
- SECOND STAGE
Players interact in a standard trust game in order to measure the effect of the previous experience on their willingness to trust.
- RESULTS a negative spillover effect of corruption on trust.

Our three-player
game

The first two stages
are as in a trust
game..

In the third stage
the third player can
withdraw part of
the surplus
generated by the
trustor and
trustee..under the
risk of auditing and
prosecution



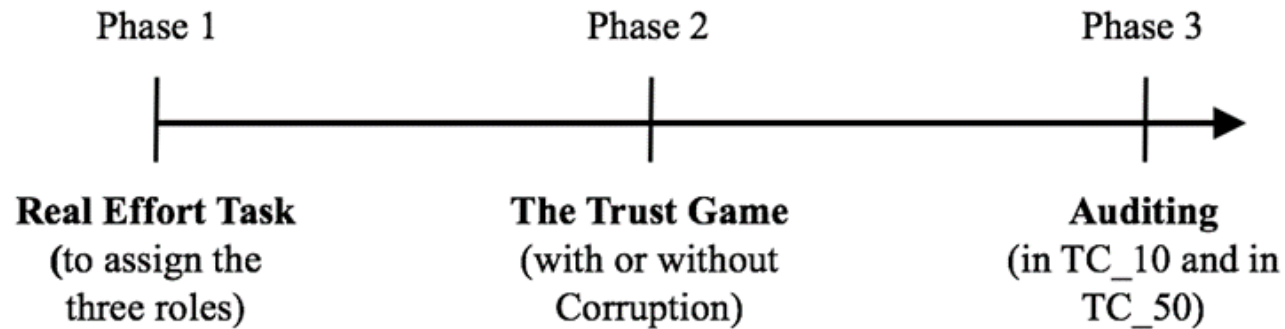
Role assignment

- In the first phase, the three roles, A, B, and C, were assigned to group members depending on subjects' relative performance in the “slider task” real effort game (Gill and Prowse, 2012).
- competing in the slider task could introduce a sense of entitlement to participate in the trust game, rather than being relegated to the mere role of C who either made no choice in the experiment (in TNC) or could only subtract resources from A and B (in TC and TC_p).
- By making the difference between best and worst performers salient, the slider task enhanced the existing conflict of interest between participants in the trust game, A and B, and the corruptor, C.

Corruption treatments

- Whatever C decides to keep reduces A's and B's payoffs from the trust game in proportion to the share of surplus, S , acquired by the subject in the trust game
- Three different versions of the corruption treatment with p respectively set at 0, 10 percent and 50 percent.
- If audited and found to have kept a positive amount of the surplus S , the payoff of the corruptor, C, is reduced by q_C plus a sanction that is proportional to the size of q_C .
- Specifically, the expected final payoff of C in TC_p is given by $\pi_C^{TC-p} = (1 - p)(E + q_C) + p(E - q_C - f q_C)$, where $f > 0$ represents the flat fine rate that the corruptor pays on q_C if audited.
- $f = 0.5$, implying that, in case of auditing, C was convicted to pay a fine of one token for every two subtracted from the surplus, S . The value of f was chosen in order to avoid bankruptcy of C

Timeline of the experiment



Differences from Banerjee

- I. We look at the impact of corruption on trust and trustworthiness within the same treatment. The stylized corruption activity has a direct effect on players' payoffs and does not enter into the game as a spillover effect produced by results and characteristics of a previous and independent treatment. Our treatment has an important element of external consistency since corruption is modelled as extorting a share of the expected payoff of the trustor and the trustee and as such, affecting, directly, their decisions of trust and reciprocity.
- II. The above described approach allows us to measure directly the expected perceived corruption and to analyze how it affects trustors' and trustees' choices.
- III. We evaluate the impact of different policies and, specifically, the relative deterrence impact of a high versus low probability of audit and fine, on both the actual third player behavior and the beliefs on corruption of the other two trust game agents.
- IV. We look at the impact of our treatments on a wide range of variables such as trust, the conditional distribution of trustworthiness (elicited with the strategy method), trustor's first order beliefs and strategic altruism (by measuring trustor's expected return on giving based on the expected reply of the trustee and behavior of the third player).

- What do you expect the homo economicus will do ?

Hypothesis testing

- *H1: ($q_A = 0$ in TNC and TC_p). When the trustor is purely self-interested, and this is common knowledge, the possibility of withdrawal of part of the surplus from a third “corrupting” agent in the trust game has no effect on trustor’s behavior. Trustor giving is zero both with and without corruption*
- *H2: ($q_B = 0$ in TNC and TC_p). In a setting with purely self-regarding trustees the possibility of withdrawal of part of the surplus from a third “corrupting” agent in a trust investment game has no effect on trustee’s giving (with or without common knowledge on purely self-regarding preferences). Trustee’s conditional giving is zero, both with and without corruption.*
- *H3: in a setting with purely self-regarding trustors, where trustors expect that trustees are non-purely self-regarding, the possibility of withdrawal of part of the surplus from third “corrupting” agent in a trust investment game has effect on trustor’s behavior (from zero to nonzero giving) if the trustor expects that his/her giving is expected to pay (not to pay) without (with) the tax (where for “pay” we mean trigger a return higher than the amount sent)*

Table 1. Balancing properties (between corruption/non corruption treatments and players' roles)

	Corruption vs non-corruption treatments	Trustor vs trustee	Trustor vs third corrupting agent	Trustee vs third corrupting agent
Male	0.520 (0.603)	0.55 (0.585)	-1.68 (0.093)	-2.21 (0.027)
Age	2.23 (0.024)	-0.14 (0.887)	1.07 (0.204)	1.27 (0.203)
Voluntary status	0.53 (0.598)	-2.131 (0.033)	z =0.029 (0.977)	1.812 (0.070)
Years of education	-0.005 (0.998)	-0.961 (0.343)	-0.847 (0.402)	0.092 (0.932)
Risk aversion*	-1.624 (0.104)	-0.073 (0.941)	0.485 (0.628)	0.535 (0.593)
Game theory knowledge	0.359 (0.730)	0.381 (0.703)	0.381 (0.703)	0.000 (1.00)

Findings on trustors

- The different corruption treatments do not significantly change aggregate trustors' behavior, that is significantly different from zero in all cases.
- Trustors without previous knowledge of game theory give significantly more in treatments with corruption with respect to trustors who know it.
- The former expect that trust pays (even though less in treatments with corruption), and therefore part of their behavior is driven by strategic altruism.
- Trustors who know game theory expect that trust does not pay in treatments with corruption, but they nonetheless give significantly more than zero.

Table 2. Average trustor giving according to treatment design and game theory knowledge

No.	Treatments	Mean	St.dev.
1	TNC (Trust game)	3.87	2.56
2	TC_00 (Trust game + corruption with 0 prob. of audit)	5.6	3.11
3	TC_10 (Trust game + corruption with 10 prob. of audit)	4.53	2.85
4	TC_50 (Trust game + corruption with 50 prob. of audit)	4.67	2.50
5	Average trustor giving in corruption treatments	4.93	2.81
6	Average trustor giving in corruption treatments (for those who do not know game theory)	5.52	2.79
7	Average trustor giving in corruption treatments (for those who know game theory)	3.34	2.67
8	Average trustor giving in no corruption treatments (for those who know game theory)	2.12	3.19
9	Average trustor giving in no corruption treatments (for those who do not know game theory)	4.25	3.2

N. of obs.: 15 per treatment. Two-sided Mann-Whitney rank-sum test ($H_0: (1) = (5)$) $z=1.31$, $p\text{-value}=0.19$. Two-sided Mann-Whitney rank-sum test ($H_0: (6) = (7)$) $z=2.34$, $p\text{-value}=0.019$. Two-sided Mann-Whitney rank-sum test ($H_0: (8) = (9)$) $z= -0.23$, $p\text{-value}=0.81$.

Table 5. Trustor giving, expectations and expected return on giving

	Trustor giving	Expected trustee's payback*	Expected corruption tax*	Expected return on giving
NTC				
TC00				
TC10				
TC50				
Players (GT)				
NTC (n=7)	2.12	1.06		6 percent
TC00 (n=6)	4.16	0.60	64 percent	Negative
TC10 (n=5)	2.2	0.73	74 percent	Negative
TC50 (n=1)	4	1.06	100 percent	negative
Players (No GT)				
NTC (n=8)	4.25	1.43		43 percent
TC00 (n=9)	6.55	1.15	64 percent	5.4 percent
TC10 (n=10)	5.7	1.08	64 percent	2.9 percent
TC50 (n=14)	4.71	1.43	64 percent	15.5 percent

Trust
expecte
d not to
pay

Trust
expected
to pay

Trustor's expectation on third agent's withdrawal

$$E[CorruptionTax]_{ij}$$

$$\begin{aligned} &= \alpha_0 + \alpha_1 Surplus_{ij} + \alpha_2 Surplus_{ij} * DTC10 + \alpha_3 Surplus_{ij} * DTC50 \\ &+ \alpha_4 Surplus_{ij} * D1GAME + \alpha_5 Surplus_{ij} * DTC10 * D1GAME + \alpha_6 Surplus_{ij} \\ &* DTC50 * D1GAME + \eta_i + \varepsilon_{ij} \end{aligned}$$

Table 3. Trustors' expectations on the "corruption tax" (third agent's withdrawal)

VARIABLES	(1)	(2)
Surplus _{ij}	0.615*** (0.026)	0.641*** (0.033)
Surplus _{ij} *DTC10	0.057 (0.037)	-0.008 (0.046)
Surplus _{ij} *DTC50	0.019 (0.037)	-0.035 (0.043)
Surplus _{ij} *DGAME		0.421*** (0.104)
Surplus _{ij} *DTC10*D1GAME		-0.305*** (0.117)
Surplus _{ij} *DTC50*D1GAME		-0.486*** (0.116)
Constant	0.416** (0.190)	0.416** (0.185)
<i>F</i> -stat		

Trustors' expectations on trustee's giving

$$E[\textit{Payback}]_{ij}$$

$$\begin{aligned} &= \alpha_0 + \alpha_1 \textit{TrustorGive}_{ij} + \alpha_2 \textit{TrustorGive}_{ij} * \textit{DTC00} + \alpha_3 \textit{TrustorGive}_{ij} \\ &* \textit{DTC10} + \alpha_4 \textit{TrustorGive}_{ij} * \textit{DTC50} + \alpha_5 \textit{TrustorGive}_{ij} * \textit{DTC00} * \textit{D1GAME} \\ &+ \alpha_6 \textit{TrustorGive}_{ij} * \textit{DTC10} * \textit{D1GAME} + \alpha_7 \textit{TrustorGive}_{ij} * \textit{DTC50} \\ &* \textit{D1GAME} + \eta_i + \varepsilon_{it} \end{aligned}$$

Table 4. Trustors' expectations on trustees' strategy

	(1)	(2)	(3)	(4)
VARIABLES	All sample	Trustors (GT)	Trustors (no GT)	All sample
TrustorGive _{ij}	1.232*** (0.071)	1.058*** (0.091)	1.430*** (0.104)	1.430*** (0.102)
TrustorGive _{ij} *DTC00	-0.252** (0.100)	-0.327** (0.139)	-0.284** (0.139)	-0.284** (0.136)
TrustorGive _{ij} *DTC10	-0.266*** (0.100)	-0.304** (0.147)	-0.359*** (0.136)	-0.359*** (0.133)
TrustorGive _{ij} *DTC50	0.036 (0.100)	0.458* (0.274)	-0.181 (0.128)	-0.181 (0.125)
TrustorGive _{ij} *D1GAME				-0.373*** (0.140)
TrustorGive _{ij} *DTC00*D1GAME				-0.043 (0.200)
TrustorGive _{ij} *DTC10*D1GAME				0.056 (0.204)
TrustorGive _{ij} *DTC50*D1GAME				0.639** (0.313)
Constant	0.373* (0.220)	0.630* (0.358)	0.245 (0.271)	0.373* (0.216)
<i>F</i> -stat	249.55	64.90	195.13	131.40
p>F	0.000	0.000	0.000	0.000
Observations	600	200	400	600
R-squared	0.651	0.596	0.687	0.664
Number of id	60	20	40	60

Table 6 Trustee's expectations on the "corruption tax" (third agent's withdrawal)

	(1)	(2)	(3)	(4)
VARIABLES	All sample	Trustees (GT)	Trustees (no GT)	All sample
Surplus _{ij}	0.638*** (0.026)	0.608*** (0.041)	0.665*** (0.033)	0.665*** (0.035)
Surplus _{ij} *DTC10	0.060 (0.036)	0.142** (0.067)	0.014 (0.044)	0.014 (0.046)
Surplus _{ij} *DTC50	0.001 (0.036)	-0.004 (0.060)	-0.001 (0.046)	-0.001 (0.048)
Surplus _{ij} *D2GAME				-0.060 (0.052)
Surplus _{ij} *DTC10*D2GAME				0.131* (0.078)
Surplus _{ij} *DTC50*D2GAME			0.003 (0.073)	

Findings on trustees

- When looking at actual trustees' behavior we find that trust does not pay (since the payback ratio applied by trustees is around 62 percent) consistently with what expected by trustors who know game theory.
- The introduction of corruption in the standard trust game experiment however generates significant excess reciprocity from trustees.
- The excess reciprocity result is driven by trustees who do not know game theory (almost 2/3 of the sample), but still expect (not differently from trustees who know game theory) that the third agent will take 62 percent of the surplus.

Trustee's strategy

$$\begin{aligned} \text{Payback}_{ij} = & \alpha_0 + \alpha_1 \text{TrustorGive}_{ij} + \alpha_2 \text{TrustorGive}_{ij} * \text{DTC00} + \alpha_3 \text{TrustorGive}_{ij} \\ & * \text{DTC10} + \alpha_4 \text{TrustorGive}_{ij} * \text{DTC50} + \alpha_5 \text{TrustorGive}_{ij} * \text{D2NOGAME} \\ & + \alpha_6 \text{TrustorGive}_{ij} * \text{DTC00} * \text{D2NOGAME} + \alpha_7 \text{TrustorGive}_{ij} * \text{DTC10} \\ & * \text{D2NOGAME} + \alpha_8 \text{TrustorGive}_{ij} * \text{DTC50} * \text{D2NOGAME} + \eta_i + \varepsilon_{it} \end{aligned}$$

Table 7. Trustee's strategy

VARIABLES	(1) All sample	(2) Trustees (GT)	(3) Trustees (No GT)	(4) All sample	(5) All sample
TrustorGive _{ij}	0.669*** (0.057)	0.796*** (0.091)	0.605*** (0.069)	0.796*** (0.095)	0.796*** (0.101)
TrustorGive _{ij} *D2NOGAME				-0.191 (0.117)	-0.191 (0.123)
TrustorGive _{ij} *DTC00	0.248*** (0.080)	0.052 (0.119)	0.373*** (0.104)	0.052 (0.125)	
TrustorGive _{ij} *DTC10	-0.107 (0.080)	-0.545*** (0.137)	0.069 (0.096)	-0.545*** (0.143)	
TrustorGive _{ij} *DTC10	0.422*** (0.080)	-0.014 (0.123)	0.692*** (0.100)	-0.014 (0.129)	
TrustorGive _{ij} *DTC00*D2NOGAME				0.320** (0.161)	
TrustorGive _{ij} *DTC10*D2NOGAME				0.614*** (0.171)	
TrustorGive _{ij} *DTC50*D2NOGAME				0.705*** (0.162)	
TrustorGive _{ij} *CORRUPTION					0.356*** (0.083)
TrustorGive _{ij} *CORRUPTION*D2GAME					-0.467*** (0.141)

Table 8. Aggregate (trustors and trustees) expectations on the corruption tax

VARIABLES	(1)	(2)
Surplus _{ij}	0.627*** (0.018)	0.652*** (0.024)
Surplus _{ij} *DTC10	0.058** (0.026)	0.005 (0.033)
Surplus _{ij} *DTC50	0.010 (0.026)	-0.024 (0.032)
Surplus _{ij} *D3GAME		0.035 (0.043)
Surplus _{ij} *DTC10*D3GAME		0.057 (0.059)
Surplus _{ij} *DTC50*D3GAME		-0.094* (0.057)

Result on third agent's behavior

- The third agent corruption tax is inelastic to the probability of audit (and correctly expected to be so by trustors and trustees, with the exception of trustors who know game theory).
- There is a slight (but not statistically significant) underestimation of the corruption tax by both trustors and trustees, whose prediction on the behavior of the third agent is substantially correct.
- Third agents who know game theory charge a significantly higher tax on the other two players.

Third agent behavior (corruption tax)

VARIABLES	(1)	(2)
Surplus _{ij}	0.708*** (0.026)	0.638*** (0.037)
Surplus _{ij} *D3GAME		0.131*** (0.050)
Surplus _{ij} *DTC10	0.055 (0.036)	0.083* (0.048)
Surplus _{ij} *DTC50	-0.057 (0.036)	-0.068 (0.050)
Surplus _{ij} *DTC10*D3GAME		-0.006 (0.073)
Surplus _{ij} *DTC50*D3GAME		0.041 (0.071)

Our findings in detail (one)

- The different corruption treatments do not significantly change aggregate trustors' behavior, that is significantly different from zero in all cases.
- Trustors without previous knowledge of game theory give significantly more in treatments with corruption with respect to trustors who know it.
- The former expect that trust pays (even though less in treatments with corruption), and therefore part of their behavior is driven by strategic altruism.
- Trustors who know game theory expect that trust does not pay in treatments with corruption, but they nonetheless give significantly more than zero.
- When looking at actual trustees' behavior we find that trust does not pay (since the payback ratio applied by trustees is around 62 percent) consistently with what expected by trustors who know game theory.

Our findings in detail (two)

- The introduction of corruption in the standard trust game experiment however generates significant excess reciprocity from trustees.
- The excess reciprocity result is driven by trustees who do not know game theory (almost 2/3 of the sample), but still expect (not differently from trustees who know game theory) that the third agent will take 62 percent of the surplus.
- The third agent corruption tax is inelastic to the probability of audit (and correctly expected to be so by trustors and trustees, with the exception of trustors who know game theory).
- There is a slight (but not statistically significant) underestimation of the corruption tax by both trustors and trustees, whose prediction on the behavior of the third agent is substantially correct.
- Third agents who know game theory charge a significantly higher tax on the other two players.

Three lessons (1)

- Evidence of trust and trustworthiness resilience in difficult economic environment (i.e. in presence of experimental treatments reproducing the main economic effects of corruption).
- i) trustors who do not know game theory give more in corruption treatments, partly because they expect more than unit payback ratios from trustees, even though lower than unit payback ratios in treatments without corruption;
- ii) trustors who know game theory (and expect a less than unit payback ratio from trustees and a higher corruption tax), choose nonetheless nonzero giving in corruption treatments;
- iii) the corruption treatment produces excess reciprocity (driven by trustees who do not know game theory).
- i) and iii) outline a sort of “gift exchange” phenomenon, limited to players who do not know game theory. This gift exchange mechanism has the power of raising trust and trustworthiness under difficult economic environments. Such resilience is not produced by a misunderstanding of the corruption added feature of the game, because expectations on the third corrupting agent’s behavior from experiment participants who do not know game theory are not statistically incorrect. A relevant part of this resilience is produced in corruption games with the highest probability of audit. Hence, effectiveness of prosecution accounts for an important part (even though not all) of trust and trustworthiness resilience in difficult economic environments.

Three lessons (2)

- As it is clear from the above described findings, knowledge/ignorance of game theory matters in discriminating between purely self-regarding and other-regarding strategies, and in players' expectations and actual behavior.
- Players who know game theory exhibit behavior and beliefs closer to the purely self-regarding paradigm. As already discussed above, this is not an experimentally controlled factor in our research. This means that it is not possible to verify whether it is game theory knowledge, *per sé*, that produces the effect, or a sorting mechanism leading individuals closer to the purely self-regarding paradigm to follow studies including game theory in their curricula.
- Lesson drawn: it is of foremost importance to take into account that populations are highly heterogeneous in educational background and preferences when modelling, investigating and predicting economic agents' behavior.
- In this sense, the incorrect and too pessimistic beliefs on the third agents' corruption tax by trustors who do know game theory may have been driven by the erroneous expectation that all third agents know game theory and behave following purely self-regarding preferences.

Lesson three...Corruption and growth

?

- Our findings produce as well interesting inferences on the aggregate dynamics of corruption and growth if we regard the trust investment game as the microeconomic core of the process of creation of economic value.
- Corruption treatments yield higher gross output (by considering it as the sum of the traditional aggregate trust game “output”, including the part of the surplus taken by the third corrupting agent), but lower net “output” (the observed sum of payoffs of trustors and trustees after the corruption tax) vis-à-vis the output of no corruption treatments.
- This is consistent with an observed negative effect between corruption and growth (under the reasonable assumption that the corruption tax goes in the informal economy), even though the gross effect, when adding the corruptor’s take in the informal sector, may become surprisingly positive.
- Previous studies, however, tend to support the former explanation (Bauman and Rose, 2011)

The 4 null hypotheses based on the purely self-regarding paradigm

-
- *H1: ($q_A = 0$ in TNC and TC_p). In a setting with purely self-regarding trustors, where purely self-regarding preferences are common knowledge, the introduction of a third “corrupting” agent in a trust investment game has no effect on trustor’s behavior. Trustor giving is zero both with and without corruption*
-
- A variant of this hypothesis is that, when trustors believe that trustee may give non zero (purely self-regarding preferences are not common knowledge) but believe that trust does not pay they will still choose zero giving based on their purely self-regarding preferences .
-
- *H2: ($q_B = 0$ in TNC and TC_p). In a setting with purely self-regarding trustees the introduction of a third “corrupting” agent in a trust investment game has no effect on trustee’s giving (with or without common knowledge on purely self-regarding preferences). Trustee’s conditional giving is zero both with and without corruption.*
-

The 4 null hypotheses based on the purely self-regarding paradigm

- *H3: in a setting with purely self-regarding trustors, where trustors expect trustees being non purely self-regarding, the introduction of a third “corrupting” agent in a trust investment game has effect on trustor’s behavior (from zero to nonzero giving) if the trustor expects that his/her giving is expected to pay (not to pay) without (with) the tax (where for “pay” we mean trigger a return from the trustee higher than the amount sent*

Note this hypothesis, to be tested, requires that trustors expect that trust pays in treatments with corruption, while it does not in treatments without corruption. To verify that we need to calculate trustor’s expected return from giving as we do in section 3.1.3

- *H4: if the third agent has purely self-regarding preferences she will apply a 100 percent tax on the surplus created by the other two players in the corruption treatments without penalty*

The third agent will charge the highest (100) tax in corruption treatment without penalty (since she does not run any risk of being prosecuted) and in corruption treatments with penalty if she is not risk averse (since a higher tax will raise her expected payoffs). If being risk averse she knows that in corruption treatment with penalties a higher tax will increase expected payoffs while the level of risk.

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“The most important lesson derived from my intellectual journey (...) is that humans have a more complex motivational structure and more capability to solve social dilemmas than posited in earlier rational-choice theory. Designing institutions to force entirely self-interested individuals to achieve better outcomes has been the major goal posited by economists for governments to accomplish for much of the past half century.

Summary and conclusions

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Extensive empirical research leads me to argue that instead, the core goal should be to facilitate the development of institutions that bring out the best in humans. We need to ask how diverse institutions help or hinder the innovativeness, learning, adapting, trustworthiness, levels of cooperation of participants, and the achievement of more effective, equitable, and sustainable outcomes."



Elinor Ostrom - Nobel Prize Winner for Economics, 2009

Assignment: what would you do to raise the level of social capital of your country...

Question n.1 in social sciencies: how we can create social capital ?

- Eliciting trustworthiness is more important than trusting
- “Buy” long term reputation with intense short term asymmetric giving (G. Akerlof, gift exchange) (evolutionary literature in trust games)
- Create positive sum games in order to make social capital production easier [positive sum games not necessarily in economic sense also in terms of intrinsic motivations (autonomy, learning, generativity, challenge)]
- Which sanctions ? Second chance but suspension of trust if asymmetry in giving persists
- Social capital accelerators are among the best policies (FondSud Italian example)
- Delivering narratives on social capital to create social capital culture
- Disseminate best practices on social capital to create emulation
- Narratives on social capital heroes trigger trust and trustworthiness (Becchetti, Corazzini, Pelligra, trust in corrupted environment)
- Relational goods reduce violation of trust and trustworthiness and foster the creation of social capital
- Taste for Generativity increases trust

The potential of feed-in tariffs

- Product A costs 10 euros (the responsible product).
- Product B costs 5 euros (the conventional product)
- You will get 3 additional euros for any player who decide to buy Product A
- The game lasts 5 rounds. After round 5 the feed-in tariff is introduced. Any buyer of product B pays a tax of 1 euro. The total tax take is divided among buyers of product A
- The feed-in tariff is budget balanced

- Declining share of conditional cooperators
- Hard base of unconditional cooperators
- Effect of the feed-in tariff after round five

Share of players buying the responsible product

