The Consistency of Fairness Rules
An Experimental Study

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UPC
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Outline

Motivation

Experiment

Fairness rules

Results

Conclusions
Motivation

1. Multiplicity of Fairness Rules

- Equity theory (Homans 1961; Adams 1965; Selten 1978; Guth 1988)
- One-size-fits-all theories (Rabin 1993; Fehr and Schmidt 1999; Bolton and Ockenfels 2000; Charness and Rabin 2002)
- Multiplicity of Fairness Rules (Konow 2000; Frohlich et al. 2004; Cappelen et al. 2007)
2. Fairness Decisions are context dependent

3. Self-serving Bias
   ▶ Messick and Sentis 1979: *when people work different amounts of time at a joint task, those who work more generally believe that they should earn more, while those who work less believe that both parties should be paid equally.*


Research questions

- Are subjects’ decisions consistent across different contexts?
- What factors lead people to be inconsistent?
Experimental Design

- Within subject design

- Different fairness concerns are induced by the change of endogenous and exogenous variables.

- Two phases
  - Production phase: Endogenous production + Exogenous shock.
  - Distribution phase

- Repeated scenario
  - Subjects play 20 times both phases
First phase (Production phase)

▶ At the beginning of each single period groups of 2 people are formed. A random stranger mechanism is used.

▶ **Individual Task**: Subjects have 90 seconds to unscramble as many puzzles as they can (max. 10).

▶ At the end of this phase both group members are informed about individual and group outcomes.

▶ Then, a random shock is introduced. Each participant has an independent 50% probability for her tokens to be halved.

▶ Example.
Screen shots
Screen shots
Screen shots
Screen shots
Second phase (Distribution phase)

- Each participant has to decide how to distribute the joint outcome between she and the other member of the group.

- No feedback. To rule out (indirect) reciprocity.

**Payment**

- One period and one subject’s decision per group.

**Questionnaire**

- Socio-demographic questions
- Strategy followed
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**Screen shots**

The total number of tokens to be distributed is 26

Please indicate the number of tokens you wish to distribute to the other participant

<table>
<thead>
<tr>
<th>In this period your number of tokens is</th>
<th>In this period the number of tokens of the other participant is</th>
<th>In this period the total number of tokens in your group is</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>20</td>
<td>32</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>In this period your total number of tokens after the shock is</th>
<th>In this period the total number of tokens of the other participant after the shock is</th>
<th>The total number of tokens to be distributed is</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>20</td>
<td>26</td>
</tr>
</tbody>
</table>
Procedures

- Computerized using zTree (Fischbacher, 2007)
- Conducted at CESS in Oxford
- 60 students from 26 different degrees
- 30 males and 30 females
- All participants were native English speakers (similar linguistic skills)
- Average earnings: 12 GBP
Fairness rules: Cappelen et al 2007

Strict Egalitarian

\[ m^{SE} = \frac{X(a, q)}{2} \]

Liberal Egalitarian

\[ m^{LE} = \frac{q_1}{q_1 + q_2} X(a, q) \]

Libertarian

\[ m^L = a_1 q_1 \]
Hypotheses

1. There is a Multiplicity of Fairness Rules.

2. Only participants that display purely selfish behavior are consistent across contexts.

3. Non-selfish decisions are context dependent. Self-serving bias would lead inconsistent decisions.
Histogram
## Multiplicity of Fairness Rules

<table>
<thead>
<tr>
<th>Rules</th>
<th>1\textsuperscript{st} period</th>
<th>All periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strict Egalitarian</td>
<td>13/60 (21.7%)</td>
<td>222/1200 (18.5%)</td>
</tr>
<tr>
<td>Liberal Egalitarian</td>
<td>5/60 (8.3%)</td>
<td>105/1200 (8.8%)</td>
</tr>
<tr>
<td>Libertarian</td>
<td>7/60 (11.7%)</td>
<td>107/1200 (8.9%)</td>
</tr>
<tr>
<td>Selfish</td>
<td>24/60 (40.0%)</td>
<td>513/1200 (42.8%)</td>
</tr>
<tr>
<td>Charity</td>
<td>7/60 (11.7%)</td>
<td>109/1200 (9.1%)</td>
</tr>
<tr>
<td>Other</td>
<td>11/60 (18.3%)</td>
<td>262/1200 (21.8%)</td>
</tr>
<tr>
<td>Rule-based behavior</td>
<td>49/60 (81.7%)</td>
<td>948/1200 (79.0%)</td>
</tr>
</tbody>
</table>

Charity: to give more than nothing and less than 4 tokens.

Q: Have you followed any particular rule to distribute the total number of tokens? A: *Largest number divisible by three.*
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Paloma Ubeda
Multiplicity of Fairness Rules

The Consistency of Fairness Rules. An Experimental Study
Consistency

<table>
<thead>
<tr>
<th>Rules</th>
<th>20 times (in every round)</th>
<th>19 times</th>
<th>18 times</th>
<th>17 times (in 85% of rounds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strict Egalitarian</td>
<td>3(5%)</td>
<td>4(6.6%)</td>
<td>6(10%)</td>
<td>7(11.6%)</td>
</tr>
<tr>
<td>Liberal Egalitarian</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Libertarian</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Selfish</td>
<td>18(30%)</td>
<td>19(31.6%)</td>
<td>20(33.3%)</td>
<td>21(35%)</td>
</tr>
<tr>
<td>Charity</td>
<td>1(1.7%)</td>
<td>1(1.7%)</td>
<td>1(1.7%)</td>
<td>1(1.7%)</td>
</tr>
</tbody>
</table>

**Why three mistakes?** Because no subject takes consistent decisions according to one of the three fairness rules more than 12 times and less than 17 times.
Consistency

Subjects’ decisions

- Subjects that ALWAYS make consistent choices
  - Selfish: 18/60 (30%)
  - Strict Egalitarian: 3/60 (5%)
  - Charity: 1/60 (1.7%)

- No subject chooses consistently (twenty times) either the Liberal Egalitarian or the Libertarian distributions
Consistency

Subjects’ decisions

- Subjects that 17 OUT OF 20 TIMES make consistent choices
  - Selfish: 21/60 (35%)
  - Strict Egalitarian: 7/60 (11.7%)
  - Charity: 1/60 (1.7%)

- No subject chooses consistently (17 times) either the Liberal Egalitarian or the Libertarian distributions
Are inconsistent participants acting in a self-serving way?
Self-Serving Bias

A rule is optimal when its associate payoff is the highest among the three fairness rules.
Self-Serving Bias

### Multinomial Logit Regression

<table>
<thead>
<tr>
<th></th>
<th>Strict egalitarian</th>
<th>Liberal egalitarian</th>
<th>Libertarian</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimal rule</td>
<td>0.323***</td>
<td>0.288***</td>
<td>0.290***</td>
</tr>
<tr>
<td></td>
<td>(0.042)</td>
<td>(0.032)</td>
<td>(0.020)</td>
</tr>
<tr>
<td>Shock</td>
<td>-0.053</td>
<td>0.063**</td>
<td>-0.001</td>
</tr>
<tr>
<td></td>
<td>(0.033)</td>
<td>(0.026)</td>
<td>(0.013)</td>
</tr>
<tr>
<td>Final endowment</td>
<td>-0.009***</td>
<td>0.005***</td>
<td>0.005***</td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td>(0.002)</td>
<td>(0.002)</td>
</tr>
<tr>
<td>Period</td>
<td>0.0001</td>
<td>-0.0002</td>
<td>-0.001</td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td>(0.002)</td>
<td>(0.001)</td>
</tr>
</tbody>
</table>

Log Likelihood = -744.6237  Observations = 1337  Pseudo $R^2 = 0.4229$
Conclusions

- There is a multiplicity of Fairness Rules.
- 46% of subjects are consistent with one rule.
  - 7 Strict Egalitarian (11.7%)
  - 21 Selfishv (35%)
  - 1 Charity (1.7%)
- Pure Liberal Egalitarian and Libertarian subjects are hard to find.
- A self-serving bias explain why some subjects are inconsistent.
Possible explanations

- The 50-50 norm is probably the best known and accepted rule of distributive justice. In our experiment as well as real life, the definition of alternative rules such as equity may be ambiguous. For instance, participants may consider it fair to distribute the money according to effort or to outcomes. In contrast, the definition of the equality norm is always the same.

- Andreoni and Bernheim (2009) claim that social image may help to explain why the equal split is a widespread norm in many social contexts. Dividing the pie equally is a clear signal of fair behavior. On the contrary, people may feel that an alternative fairness rule, e.g., liberal egalitarian or libertarian, do not convey as clear signal of fairness as the egalitarian rule.
Thanks for your attention!
## Behavioral Determinants

### Fixed-effects model

<table>
<thead>
<tr>
<th></th>
<th>Marginal Effects</th>
<th>Standard errors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cons</td>
<td>70.630***</td>
<td>(1.460)</td>
</tr>
<tr>
<td>Period</td>
<td>0.334***</td>
<td>(0.051)</td>
</tr>
<tr>
<td>Shock</td>
<td>0.911</td>
<td>(0.691)</td>
</tr>
<tr>
<td>Final endowment</td>
<td>0.115**</td>
<td>(0.022)</td>
</tr>
</tbody>
</table>

Observations = 1200  
\[ F(59, 1137) = 72.90 \]  
\[ \text{Prob} > F = 0.0000 \]
## Tokens deviations

<table>
<thead>
<tr>
<th></th>
<th>0 tokens</th>
<th>1 tokens</th>
<th>2 tokens</th>
<th>3 tokens</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strict Egalitarian</td>
<td>222 (18.5%)</td>
<td>253 (21.1%)</td>
<td>296 (24.7%)</td>
<td>328 (27.3%)</td>
</tr>
<tr>
<td>Liberal Egalitarian</td>
<td>105 (8.8%)</td>
<td>131 (10.9%)</td>
<td>175 (14.6%)</td>
<td>194 (16.1%)</td>
</tr>
<tr>
<td>Libertarian</td>
<td>107 (8.9%)</td>
<td>143 (11.9%)</td>
<td>205 (17.1%)</td>
<td>239 (19.9%)</td>
</tr>
<tr>
<td>Selfish</td>
<td>513 (42.8%)</td>
<td>558 (46.5%)</td>
<td>598 (49.8%)</td>
<td>622 (51.8%)</td>
</tr>
<tr>
<td>Charity</td>
<td>109 (9.1%)</td>
<td>136 (11.3%)</td>
<td>159 (13.3%)</td>
<td>233 (19.4%)</td>
</tr>
<tr>
<td>Others</td>
<td>262 (21.8%)</td>
<td>215 (17.9%)</td>
<td>111 (9.3%)</td>
<td>89 (7.4%)</td>
</tr>
<tr>
<td><strong>Total explained</strong></td>
<td>938 (78.2%)</td>
<td>985 (82.1%)</td>
<td>1089 (90.8%)</td>
<td>1111 (92.6%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>109.9%</td>
<td>119.6%</td>
<td>128.8%</td>
<td>141.9%</td>
</tr>
</tbody>
</table>
## Cluster analysis

<table>
<thead>
<tr>
<th>Possible rules</th>
<th>4 Categories</th>
<th>5 Categories</th>
<th>6 Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strict Egalitarian</strong></td>
<td>306(25.5%)</td>
<td>295(24.6%)</td>
<td>269(22.4%)</td>
</tr>
<tr>
<td><strong>Liberal Egalitarian</strong></td>
<td>119(9.9%)</td>
<td>104(8.7%)</td>
<td>84(7.0%)</td>
</tr>
<tr>
<td><strong>Libertarian</strong></td>
<td>181(15.1%)</td>
<td>117(9.8%)</td>
<td>87(7.3%)</td>
</tr>
<tr>
<td><strong>Selfish</strong></td>
<td>594(49.5%)</td>
<td>567(47.3%)</td>
<td>580(48.3%)</td>
</tr>
<tr>
<td><strong>Charity</strong></td>
<td>——</td>
<td>117(9.8%)</td>
<td>113(9.4%)</td>
</tr>
<tr>
<td><strong>Others</strong></td>
<td>——</td>
<td>——</td>
<td>67(5.6%)</td>
</tr>
</tbody>
</table>

**Observations**=1200

**Pearson**

\[
\chi^2(177) = 1.8e \pm 0.3 \\
Pr=0.000
\]

**Likelihood**

\[
\chi^2(177) = 1.8e \pm 0.3 \\
Pr=0.000
\]
Are Women More Sensitive to the Decision-Making Context?
Hypotheses

1. Women on average respond more often to changes in the social context of the experiment.

2. Individual women adopt on average a larger number of decision principles.
Regularity 1. No differences in performance.
Regularity 2. Women are less selfish than men.
Regularity 3. Women’s fair behavior is heterogeneous, men’s fair behavior is almost inexistent.
Regularity 4. Most men are consistently selfish, most women are inconsistent.
How do our results compare to previous literature?

<table>
<thead>
<tr>
<th>Previous studies</th>
<th>This paper</th>
</tr>
</thead>
</table>
| **Women are more prosocial**  
(Eckel and Grossman, EJ 1998) | On average, women keep 14% less than men (73% vs. 87%) |
| **Women are more egalitarian**  
(Andreoni and Vesterlund, QJE 2001)  
(Dufwenberg and Muren, JEBO 2006)  
(Guth, Schmidt and Dutter, EJ 2007) | Women make three times more equal splits than men (28% vs. 9%)  
20% of women vs. 3% of men consistently split the pie equally  
Women are more equititative than men (16.7% vs. 4.5% of equity choices) |
| **Women are more sensitive to social cues**  
(Cox and Deck, EI 2006)  
(Buchan, Croson and Solnick, JEBO 2008) | Only women are affected by exogeneous shocks  
The effect of relative performance in women is twice as large as in men |
| **No gender differences in performance in a noncompetitive task**  
(Geezy, Niederle and Rustichini, QJE 2003)  
(Niederle and Vesterlund, QJE 2007) | On average, women solved 6.01 puzzles per period. Men solved 6.03  
We do not observe any decay in the performance of women or men |

Note: new findings in red
This paper provides a paradigmatic example of higher sensitivity of women to social cues:

1. Men and women carry out a noncompetitive task where they perform equally well.

2. Men disregard most of the feedback provided after the task and behave consistently selfish.

3. Women rely on feedback on the task and show a much more heterogeneous behavior.

4. Differences in prosociality can be traced back to differences in the use of contextual information.