

Growth & Inequality in Dynamic Public Goods Games

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Introduction

In an attempt to incorporate uncertainty to Gächter et al. (2017)'s dynamic public goods game (DPGG), I plan to run a series of remote online experiments using oTree (Chen, Schonger, and Wickens 2016). The first experiment will replicate Gächter et al.'s NOPUNISH 10-period version as close as possible (given the remote circumstances). The current demo version of the experiment can be found here. Click here to visit the corresponding Github repository.

This document explores the data provided by Gächter et al. (2017) and finds that some of the variables are a little off. In addition, it fails to replicate the original article's figures. The following chapter will describe the available data. Subsequently, data excerpts will demonstrate that the original *Gini coefficient* varies within groups (in selected periods) and the *share of current endowment contributed* is calculated using the last round's endowment. Afterwards, the data is processed and made available for downloads. The Visualizations chapter will then present the original figures as well as figures reproduced using the original and re-calculated variables to demonstrate differences.

Original Data

Description

The data can be found in the supplementary materials they provide in the online appendix and contains, among others, the following variables:

- `exp_num` is a session identifier
- `per` denotes the period
- `gr_id` is a group identifier (carrying treatment information)
- `subj_id` is a subject identifier
- `tokens` reports a subject's endowment in a period
- `other[1-3]` report the other group members' endowments in a period
- `gdp` equals the sum of endowments of a group in a period
- `putin` reports a subject's contribution in a period
- `pu[1-3]` report the other group members' contributions in a period
- `sum` equals the sum of contributions of a group in a period
- `gini` reports a group's Gini coefficient in a period
- `mean` reports the fraction of `sum`/`lagged(gdp)`
- `totallost` ?

I add three new measures, namely: `gini2`, `mean2` and `gpd2`. `gini2` differs from the original as it is constant within groups. `mean2` is equivalent to the original `mean` but relies on the current `gdp` instead of the lagged measure. In addition to the `gpd` (stating the endowment at the *beginning* of a period), I calculate `gpd2` for the noPunish treatments and thereby report the income at the *end* of a period. Finally, I create a `treatment` string-variable .

Tables

Table 2: OLS Regression Wealth

Table 1:

| | <i>Dependent variable:</i> | | | | | |
|----------------|----------------------------|-----------------------|-----------------------|------------------------|----------------------|--------------------------|
| | Wealth (Table 2) | | | | | |
| | All | Below median | Above median | All | Below median | Above median |
| punish | 106.97 (185.66) | -213.03*** (17.68) | 361.27 (280.21) | -790.40 (801.48) | -101.34 (101.28) | -1,239.39 (1,408.14) |
| Constant | 439.70*** (71.46) | 238.33*** (12.51) | 659.36*** (117.86) | 1,503.47** (732.19) | 239.71*** (23.86) | 2,609.25** (1,269.49) |
| Long Game? | No | No | No | Yes | Yes | Yes |
| Observations | 176 | 88 | 88 | 120 | 60 | 60 |
| R ² | 0.01 | 0.87 | 0.07 | 0.03 | 0.06 | 0.05 |

Note:

*p<0.1; **p<0.05; ***p<0.01
Robust standard errors in parentheses

Table 3: OLS Regression Gini coefficient

Table 2:

| | <i>Dependent variable:</i> | | | | | |
|----------------|-------------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| | Original Gini coefficient (Table 3) | | | | | |
| | All | Below median | Above median | All | Below median | Above median |
| punish | -0.02 (0.07) | 0.01 (0.13) | -0.04 (0.06) | -0.04 (0.07) | -0.01 (0.11) | -0.07 (0.07) |
| Constant | 0.22*** (0.03) | 0.25*** (0.04) | 0.18*** (0.03) | 0.18*** (0.04) | 0.16*** (0.05) | 0.20*** (0.06) |
| Long Game? | No | No | No | Yes | Yes | Yes |
| Observations | 176 | 88 | 88 | 120 | 60 | 60 |
| R ² | 0.002 | 0.0002 | 0.02 | 0.01 | 0.001 | 0.06 |

Note:

*p<0.1; **p<0.05; ***p<0.01
Robust standard errors in parentheses

Table 3: OLS Regression re-calculated Gini

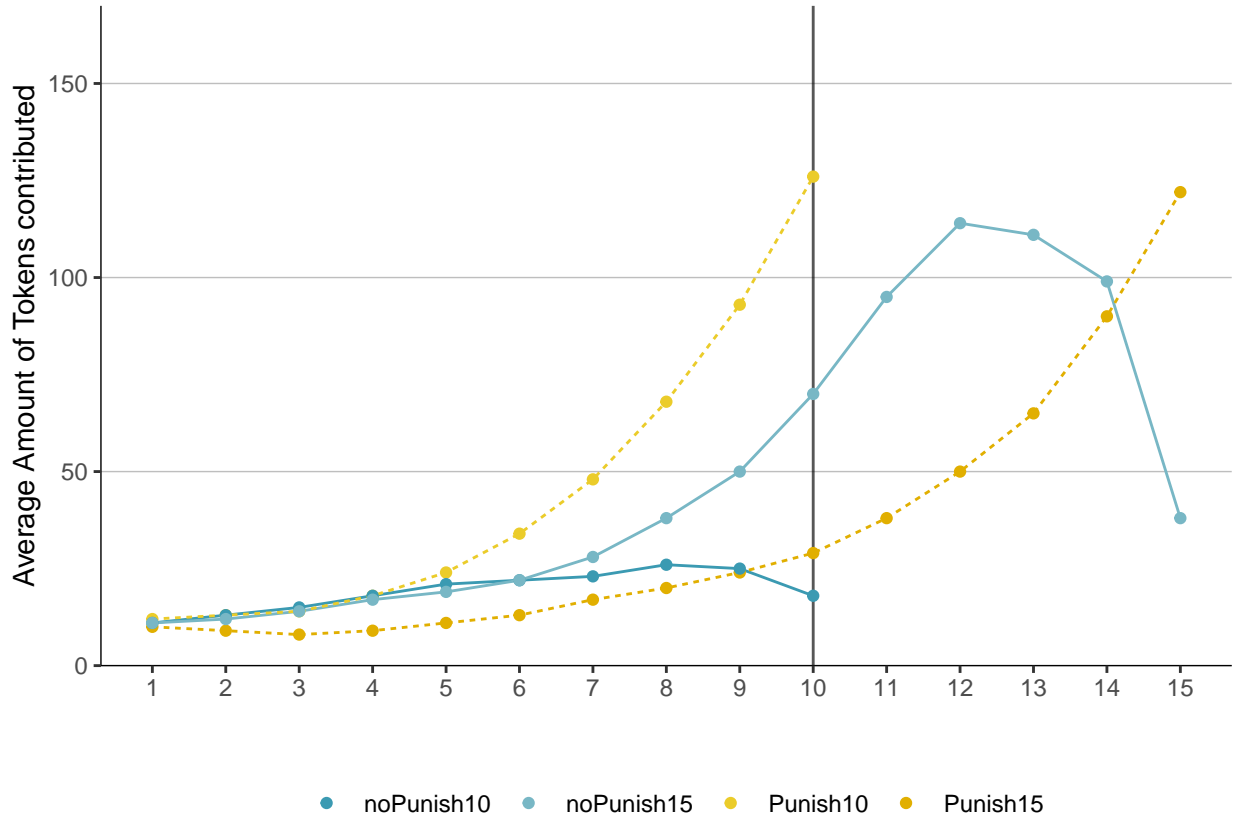
Table 3:

| | <i>Dependent variable:</i> | | | | | |
|----------------|--------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| | Re-calculated Gini coefficient | | | | | |
| | All | Below median | Above median | All | Below median | Above median |
| punish | 0.001 (0.06) | 0.05 (0.12) | −0.04 (0.05) | −0.03 (0.05) | −0.01 (0.09) | −0.05 (0.06) |
| Constant | 0.18*** (0.02) | 0.20*** (0.03) | 0.15*** (0.02) | 0.14*** (0.03) | 0.13*** (0.04) | 0.16*** (0.05) |
| Long Game? | No | No | No | Yes | Yes | Yes |
| Observations | 176 | 88 | 88 | 120 | 60 | 60 |
| R ² | 0.0000 | 0.01 | 0.02 | 0.01 | 0.001 | 0.06 |

Note:

*p<0.1; **p<0.05; ***p<0.01
Robust standard errors in parentheses

Figures



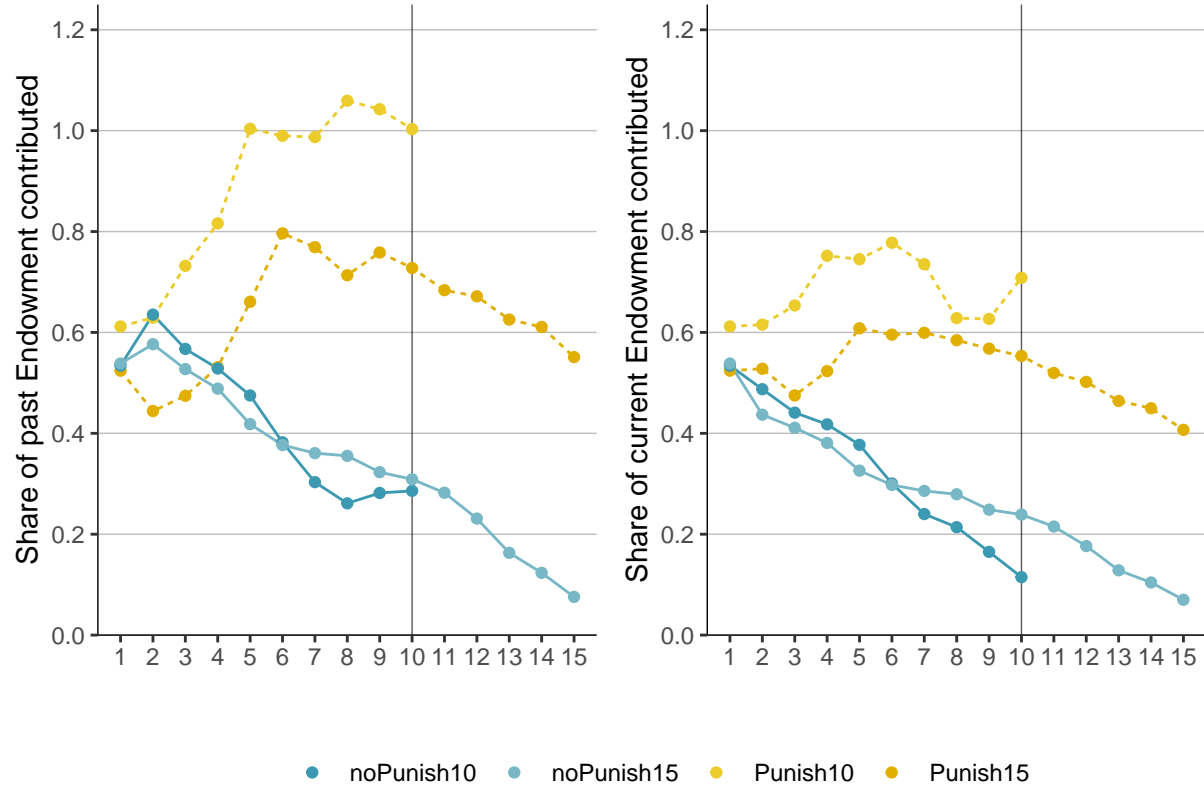


Table 4:

| Statistic | nopunish10 | punish10 | nopunish15 | punish15 |
|-----------|------------|-----------|------------|-----------|
| Mean | 439.696 | 546.667 | 1,503.467 | 713.067 |
| Median | 299 | 143.000 | 422.000 | 248.000 |
| St. Dev. | 345.400 | 793.178 | 2,873.792 | 1,279.547 |
| Max | 1,663 | 2,724.000 | 8,687.000 | 5,096.000 |
| Min | 158 | 0.000 | 155.000 | 0.000 |
| N | 23 | 21 | 15 | 15 |

The rank sum tests yield p-Values of 0.0951 and 0.3832 for the mean `gdps` during the last period of the short and long games, respectively. This indicates that there is no significant difference between punish and nopunish treatments (at the 5%-level).

References

- Chen, Daniel L., Martin Schonger, and Chris Wickens. 2016. "oTree-an Open-Source Platform for Laboratory, Online, and Field Experiments." *Journal of Behavioral and Experimental Finance* 9: 88–97. <https://doi.org/10.1016/j.jbef.2015.12.001>.
- Gächter, Simon, Friederike Mengel, Elias Tsakas, and Alexander Vostroknutov. 2017. "Growth and Inequality in Public Good Provision." *Journal of Public Economics* 150: 1–13. <https://doi.org/10.1016/j.jpubeco.2017.03.002>.