Intergenerational democracy for sustainable water allocation

Jung S. You
Department of Economics, California State University-East Bay

Introduction

- My research question is how different institutional rules and voter composition from different generations lead individuals to conserve surface water resources, leaving enough to provide for the next generation.
- To answer this question, my research project extends the intergenerational good democracy for sustainable water allocation.

Experiment Design

- I designed the IGG online experiment on Qualtrics and deployed it on the CloudResearch platform. Amazon Mechanical Turk (Mturk) was linked to CloudResearch that provides an intuitively designed interface for online experiments and ensures the quality of Mturk workers.
- The experiment collected responses from Mturk workers between May 17, 2022 and May 29, 2022.
- Each worker had to take a comprehension quiz before entering one of the four online IGG games (institution setups). If they failed to answer the comprehension quiz correctly, the game ends and the participant only received a show-up fee of $5.50.
- Once a worker passed the comprehension quiz, they played a game (that was randomly assigned by Qualtrics among four games) and answered a demographic survey before they left the game. Depending on their performance in the task, a bonus payment ranged between $0.00 and $2.00.

For example, the unregulated IGG without overlapping generations displayed the following page of instruction to the participants.

Example of an IGG

- Individuals who passed the comprehensive quiz were directed to participate one of four IGG.
- For example, in the unregulated IGG without overlapping generations, a participant was required to answer the following question:

Analytical Methods

- I conduct a set of computer simulations using the data generated by the Mturk participants. Since all subjects in a given condition received the same set of information and therefore made decisions which are effectively interchangeable. Thus in each simulation run, I randomly sample (with replacement) a series of generations of participant decisions, and calculate the fraction of those generations in which the pool was refilled. Using this procedure, I first simulated 10,000 pools out to 15 generations for (1) unregulated without overlapping generations (2) baseline voting without overlapping generations (3) unregulated with overlapping generations (4) baseline voting overlapping generations.
- To examine the effect of a treatment, I use a linear probability model taking (1) unregulated as the baseline and estimate the proportion of pools sustained including dummies for each other condition.

Results

- I employed 2500 Mturk workers. The passage rate of the comprehension quiz was 81%, which guarantees 2,021 complete responses. Thus, each institutional setup has at least 500 complete responses. The key results are displayed in the table below.

<table>
<thead>
<tr>
<th>Institutional Setup</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unregulated, one period participation</td>
<td>9.73</td>
<td>4.75</td>
<td>505</td>
</tr>
<tr>
<td>Baseline voting, one period participation</td>
<td>8.43</td>
<td>4.27</td>
<td>503</td>
</tr>
<tr>
<td>Unregulated, overlapping generations</td>
<td>First period</td>
<td>8.64</td>
<td>3.97</td>
</tr>
<tr>
<td>Unregulated, overlapping generations</td>
<td>Second period</td>
<td>9.18</td>
<td>4.57</td>
</tr>
<tr>
<td>Baseline voting, overlapping generations</td>
<td>First period</td>
<td>7.88</td>
<td>3.48</td>
</tr>
<tr>
<td>Baseline voting, overlapping generations</td>
<td>Second period</td>
<td>8.65</td>
<td>4.32</td>
</tr>
</tbody>
</table>

Key Findings

- Different age or generation groups have voting rights in the current issues. Young voters have stake in the future resource availability while they can participate in the legislation in the current time. Therefore, understanding the impact of overlapping generations on group decision-making outcomes is important for policy design.
- My results are two-folds:
  1. A democratic decision-making system promotes sustainable resource allocations over multiple generations
  2. A representation of the future generations in the group decision-making system promotes sustainable resource allocations.

Future Direction of Work

- To understand individual’s decision making, I plan to conduct a series of regressions using demographic data of the experiment participants generated at the exit survey.
- The empirical data will be used to evaluate the economic theory models that I formulate to explain the predicted behavior.

References


Acknowledgments

- Support for this project was provided by a 2021-22 faculty support grant from the Cal State East Bay Division of Academic Affairs.