Participation Game Experiments: Explaining Voter Turnout

by

Joep Sonnemans and Arthur Schram

CREED
University of Amsterdam
Roetersstraat 11
1018 WB Amsterdam
the Netherlands

The paradox of voter turnout has been the subject of academic debate for decades (for an early survey, see Schram, 1991). The debate probably started with Downs' (1957) formulation of the problem. He noted that the expected benefits from voting in a large-scale election are generally outweighed by the cost of the act. Nevertheless a very large number of voters actually turns out to vote in general elections. Many theoretical and empirical papers have been published trying to explain the paradox, but only in the last 20 years or so have rational choice models been developed that show that turning out to vote might sometimes be rational in an instrumental sense (see Ledyard 1984, or Schram 1991, and the references given there).

Palfrey and Rosenthal (1983) model the turnout problem as a participation game and study it game-theoretically. In this game, there are two or more teams. Everyone has to make a private decision that is beneficial to every member in one’s own team and harmful to members of other teams. The decision is whether or not to ‘participate’ in an action, where participation is costly. Palfrey and Rosenthal show that in many cases Nash-equilibria with positive levels of participation exist. Goeree and Holt (2000) derive Quantal Response Equilibria (QRE) for these games.

It is difficult to study voter turnout using field data. Participation games provide a structure to study this decision experimentally, however. This has been done by Bornstein (1992) and Schram and Sonnemans (1996a,b). Extensions are presented in Cason and Mui (2002) by varying turnout costs, Großer and Kugler (2002), by introducing floating voters and Großer and Schram (2003) by introducing information about another voter’s decision. Here, we shall present some of the results reported in the two papers by Schram and Sonnemans. We begin with a brief description of the experiments. More details about the design and procedures are given in our two 1996 papers.
In the experiments, subjects were split in two groups of 6 individuals, named yellow and blue. Each subject had to decide whether or not to buy a token. The price of a token (i.e., the cost of participation) was common knowledge and equal for everyone. The number of tokens bought in each group determined the payoffs. The payoff was equal for everyone within a group. The earnings of a subject in a period equaled this payoff minus the cost of a token if that subject bought one. This was repeated for 20 periods.

There were two payoff schedules, representing a winner-takes-all election (WIN) and proportional representation (PR). In WIN, each member of the group that bought the most tokens (won the elections) received a payoff of 2.50 Dutch Guilders and the payoff for the other group was zero. A tie was broken randomly with equal probability for both teams. In PR the payoff to any group-member was proportional to the relative turnout of the groups. More precisely, the number of tokens bought in one's own group was divided by the total number of tokens bought and the result was multiplied by 2.22 Dutch Guilders. The price of a token was 1.00 Dutch Guilders in WIN and 0.75 Dutch Guilders in PR. These payoff schedules were presented to the subjects in matrix form. Nash equilibria of the static (one-shot) game in pure strategies are 1-1 (in both groups 1 token is purchased) in PR and 6-6 in WIN. One quasi-symmetric mixed strategies equilibrium (all subjects in one group buy a token with the same probability) exists in PR: all subjects buy a token with probability 0.098. In WIN two quasi-symmetric mixed strategies equilibria exist in which all subjects buy either with probability 0.051 or 0.949.

Besides the distinction in WIN and PR, in some sessions we used a partners (fixed group) and others a strangers (groups rematched in every period) design. This gives four different kinds of sessions: WIN-partners, WIN-strangers, PR-partners, and PR-strangers. Each kind was run in two sessions. In addition, we ran two additional WIN-partners and two additional PR-partners sessions. In these, we added a surprise 5 extra periods. Before these were run (with the same groups and same conditions), subjects were allowed to talk freely within the own group, for five minutes.

Before presenting the results for these sessions, we briefly describe the results of some related participation game experiments we ran. To investigate the effect of group size, we ran two WIN-partners sessions with groups of 14 subjects and two WIN-partners sessions where one group consisted of 8 and the other of 6 participants. On average, subjects bought 7.36, 7.63, and 8.67 tokens in 20 periods when in a group of 14, 8 (facing a group of 6), and 6 (facing a group of 8),
respectively. In comparison, on average 8.40 tokens were bought when in a group of 6 (facing a group of 6). None of the differences are statistically significant, however.

[Figure 1 about here]

The results of the 12 sessions are presented in Figure 1. The hypothesis (point prediction) that subjects play a Nash-equilibrium in pure or quasi-symmetric mixed strategies is rejected. Details of the tests are presented in Schram and Sonnemans (1996a), where we also show that the choices observed do not constitute an asymmetric Nash equilibrium. Goeree and Holt (2000) show that the data are consistent with a QRE analysis.

We find interesting differences in behavior across treatments. Though these differences decrease towards the end of the 20 periods, two effects that appear to be present in the data are that:

(1) participation is higher in winner-takes-all than in proportional representation (in spite of the lower costs of participation in the latter case).

(2) participation is higher in partners than in strangers (especially in winner-takes-all).

Both effects are statistically significant. In addition, the restart shows that:

(3) participation increases substantially (and statistically significantly) after five minutes of free communication. This is in line with the results of Bornstein (1992).

References


Figure 1: Participation Rates:
The fraction of subjects that buys a token (participates) per period. WIN= winner-takes-all; PR=proportional representation.

1. Participation is higher in winner-takes-all than in proportional representation.

2. For winner-takes-all, participation is higher in partners than in strangers; the effect is similar but less pronounced for proportional representation.

3. A surprise restart after free communication boosts participation, especially in winner-takes-all.

Differences are small in the last 5 periods.