

Game Theory and Democracy
Steven J. Brams, New York University, USA.

This minicourse will focus on two essential features of democracy:

- how individual preferences can be aggregated to give a social choice or election outcome that reflects the interests of the electorate; and
- how public and private goods can be divided in a way that respects due process and the rule of law.

Whereas questions of aggregation are the focus of social choice theory, questions of division are the focus of fair division. Game theory illuminates strategic features of both sets of questions.

Democracy will generally mean representative democracy, in which citizens vote for representatives, from a president on down. But referendums, in which citizens vote directly on propositions—just as they did in assemblies in ancient Greece—will also be analyzed.

Emphasis will be given to procedures, or rules of play, that produce outcomes. By making precise properties what one wishes a voting or fair-division procedure to satisfy and clarifying relationships among these properties, mathematical analysis can strengthen the intellectual foundations on which democratic institutions are built. But because there may be no procedure or institution that satisfies all the properties one might desire, trade-offs among the properties will be studied. In the case of procedures that have been used, practical problems of implementation will be discussed.

Institutional Design and Engineering

The voting and fair-division procedures that will be analyzed foster democratic choices by giving voters better ways of expressing themselves, by electing officials who are more likely to be responsive to the electorate, and by allocating goods to citizens that ensure their shares are equitable or preclude envy. In some cases current procedures will be criticized, but most of the analysis will be constructive, suggesting how extant procedures can be improved.

Designing procedures that satisfy desirable properties, or showing the limits of doing so, is sometimes referred to as institutional design or mechanism design. Empirical examples to illustrate this approach will be presented, but the bulk of the analysis will be theoretical.

The product of such analysis is normative: The prescription of new procedures or institutions that are superior, in terms of the criteria set forth, to ones that arose more haphazardly. Like engineering in the natural sciences, which translates theory (e.g., from physics) into practical design (e.g., a bridge), engineering in the social sciences translates theory into the design of political-economic-social institutions that better meet the criteria one deems important.

Readings will be assigned from Brams (2008).

Reference

Steven J. Brams (2008). *Mathematics and Democracy: Designing Better Voting and Fair-Division Procedures*. Princeton University Press, 2008.

<http://press.princeton.edu/titles/8566.html>

<http://www.amazon.com/Mathematics-Democracy-Designing-Fair-Division-Procedures/dp/0691133212>