

Chapter 20. Application to Politics: Strategic Voting

- Definitions
- Examples
- Agenda-Setting
- Impossibility Theorem

Problem

- How do we assist voters in casting votes in accordance with their choices?
- How do we assist process designers in creating voting mechanisms which encourage the true expression of preferences?
- How can we assist in the study, analysis and mediation of political processes?

Voting and its Relevance

- The engineering process entails collecting requirements from stakeholders
- These requirements may be seen as votes for a collective solution
- Thus, the questions are relevant to technology designers
- Designers are therefore much concerned with questions involving the expression and reconciliation of preferences in an open setting
- Note that we could also be discussing policy design, governmental elections, committee processes or legislative processes here

Sincere Voting and Sophistication

- *Sincere voting* means selecting your preferred candidate in a vote
- *Sophisticated voting* means voting with an eye towards engineering preferred outcomes
- A procedure for which you are made better off by voting sincerely is known as *strategy proof*
- A procedure preventing you from communicating with others to your mutual advantage is known as *coalition proof*

Admissible Strategy

- An admissible strategy is one which is not dominated
- In one-shot elections voting for your last-place candidate is never admissible
- Voting for your second best candidate may be admissible if you would otherwise be stuck with the worst candidate

Sequential Pairwise Voting and Agenda-Setting

- We may subject candidates to a run-off
- Or, we may otherwise request participants vote in a series of *sequential pairwise* votes, also known as a tournament
- The order in which we submit the candidates is known as the *agenda*
- Exercise 20.3 provides an example where agenda-setting allows any option to be selected at the discretion of the agenda setter or process designer

Examples for Analysis

1970 New York Senate Election

1980 U. S. Presidential Election

- Reagan, Carter and Anderson
- Anderson split the vote on the left

1988 U.S. Financial Assistance to Contra Rebels

- Illicit attempts to support the Contra rebels discovered
- Explicit aid deliberated in the House of Representatives



Finding Sophisticated Voting Outcomes

- Consider which players stand to lose by sincere voting
- Recognize that choosing second-best outcomes can be an instrument for improving your overall outcomes
- Identify those second-best outcomes for those players that you have identified
- Evaluate whether making those second-best choices can in fact cause a shift in the vote

Engineering the Agenda

- **Recognize** that for n items in the agenda, there are $n!$ possible agendas
So for instance for four choices there are twenty-four possible agendas ($4! = 4 * 3 * 2 * 1 = 24$)
- **Enumerate** all possible agendas
- **Work** through each agenda systematically as needed
- **Engineer** the emergence of unpopular choices by creating tournaments where all viable alternatives are lost by sincere voting
- Engineering specific outcomes often possible depending on preference structure

Impossibility Theorem

- Kenneth Arrow (1951)
- No voting system can convert the ranked preferences of individuals into a community-wide ranking
- Resulted in dismay on the part of engineers and policy analysts
- Let's take a look at what the theorem says and does not say

Arrow's Axioms

The impossibility theorem is axiomatic

- **Unrestricted Domain:** All voters must be presented with real choices
- **Transitivity:** Consistent ordering of preferences
- **Non-Dictatorship:** No dictators
- **Pareto Efficiency:** Unopposed preferences should be adopted
- **Independence of Irrelevant Alternatives:** Best choices remain best even if new choices are offered which are not best

The Impossibility Theorem

Does not preclude

- Communities which already have a consensus
- Feasible designs within an otherwise circumscribed space of solutions
- Designers or individuals making choices as they see fit