Should the Majority Rule?

When Majority Voting Leads to Suboptimal Choices

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Questions

- Is the majority rule efficient?
- How does its efficiency depend on how we conceptualize individual preferences and utilities?

Inefficient Majorities

Table: Example for Inefficient Majorities

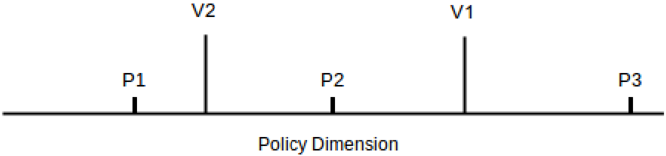
	Policy 1	**Policy 2**
Voter 1	10	100
Voter 2	110	100
Voter 3	110	100

Conceptualization of efficiency:

- Does the election result maximize the aggregated utilities for all voters?
- $\sum_i U_i^W \geq \sum_i U_i^L$

Voting, Ideal Points, and Utilities

- Spatial theory of voting (e.g. Downs, 1957; Enelow and Hinich, 1984):
  - common policy / ideological dimension
  - utilities determined by relative proximity



$$U_{ij} = -(V_i - P_j)^2$$

Simulation Scenarios

- Overview:
  - Number of voters in each election: 2000
  - Number of candidates in each election: 2
  - Number of simulations for each scenario: 1000
  - Individual utilities based on ideal points or directly simulated from distributions; voters vote for the candidate that maximizes their utility
  - Goal: investigate the efficiency of majority voting under varying assumptions about voter preferences (conceptualization, shape, etc.)

Study 1: Direct versus Spatial Utilities I

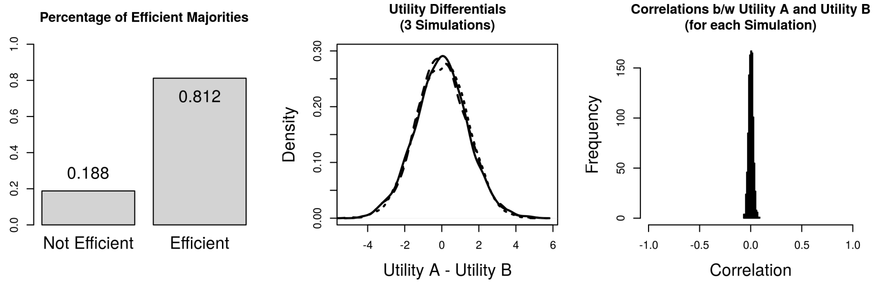


Figure: Direct preferences

$$U_{ij} \sim \mathcal{N}(\mu = 0, \sigma^2 = 1)$$

Study 1: Direct versus Spatial Utilities II

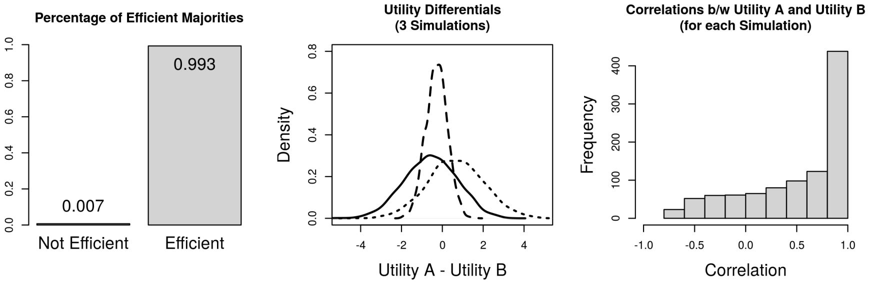
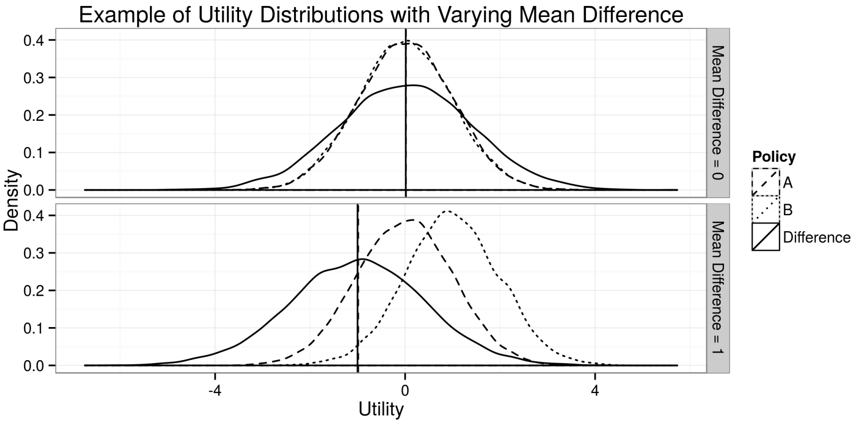


Figure: Spatial preferences

$$V_i, P_j \sim \mathcal{N}(\mu = 0, \sigma^2 = 1)$$

$$U_{ij} = -(V_i - P_j)^2$$

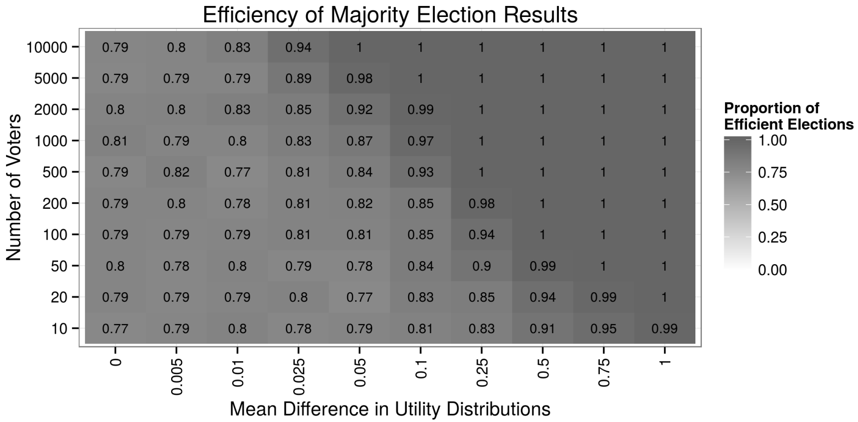
Study 3: Mean Differences in Policy Utilities I



$$U_{i,A} \sim \mathcal{N}(\mu = 0, \sigma^2 = 1)$$

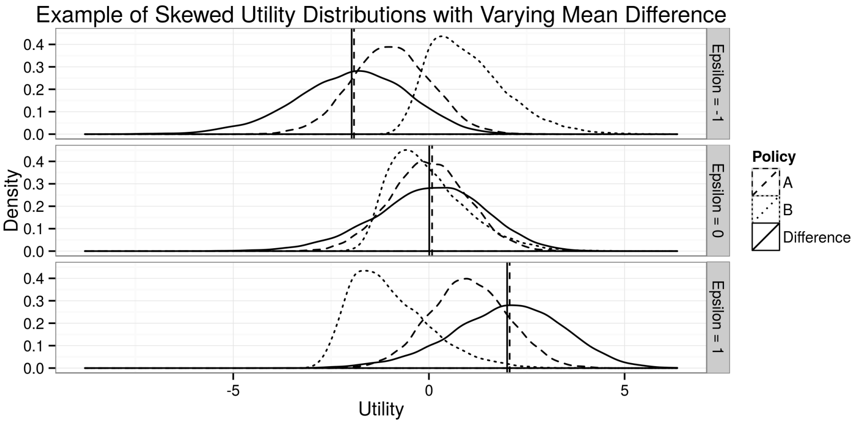
$$U_{i,B} \sim \mathcal{N}(\mu = 0 + \epsilon, \sigma^2 = 1)$$

Study 3: Mean Differences in Policy Utilities II



$$U_{i,A} \sim \mathcal{N}(\mu = 0, \sigma^2 = 1)$$
$$U_{i,B} \sim \mathcal{N}(\mu = 0 + \epsilon, \sigma^2 = 1)$$

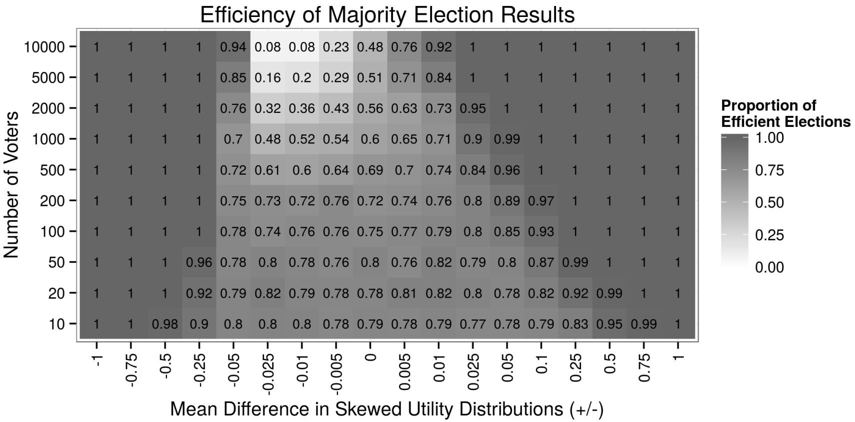
Study 4: Skewed Policy Utilities I



$$U_{i,A} \sim \mathcal{N}(\mu = 0 + \epsilon, \sigma^2 = 1)$$

$$U_{i,B} \sim \mathcal{N}_{\text{skew}}(\mu = 0 - \epsilon, \sigma^2 = 1, \gamma = .85)$$

Study 4: Skewed Policy Utilities II



$$U_{i,A} \sim \mathcal{N}(\mu = 0 + \epsilon, \sigma^2 = 1)$$

$$U_{i,B} \sim \mathcal{N}_{\text{skew}}(\mu = 0 - \epsilon, \sigma^2 = 1, \gamma = .85)$$

General Discussion

- Efficiency of majority rule is contingent on assumptions/shape about voters' utilities
  - aggregate difference and skewness of the distributions of individual utilities for each candidate affects the likelihood of inefficiencies
  - under some scenarios, increasing the size of the electorate actually reduces the efficiency of majority voting!
- Spatial utilities might overestimate efficiency due to (implicit) assumption of asymmetric policy positions

Further Developments

- Additional scenarios: vary number of policies, introduce uncertainty, vary decision rule etc.
- Consequences for political competition
- Endogenous participation and efficiency
- Experimental designs
- Estimate likelihood for tyranny of the majority in the context of actual political issues

Study 2: Correlated Policy Utilities I

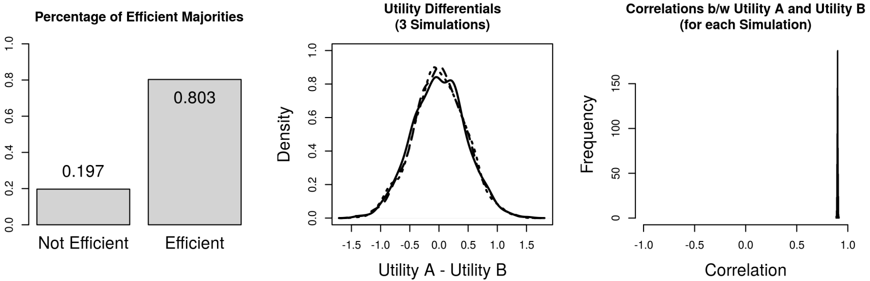


Figure: Positively correlated utilities

$$\mathbf{U}_i \sim \mathcal{N}\left(\mu = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \mathbf{\Sigma} = \begin{pmatrix} 1 & 0.9 \\ 0.9 & 1 \end{pmatrix}\right)$$

Study 2: Correlated Policy Utilities II

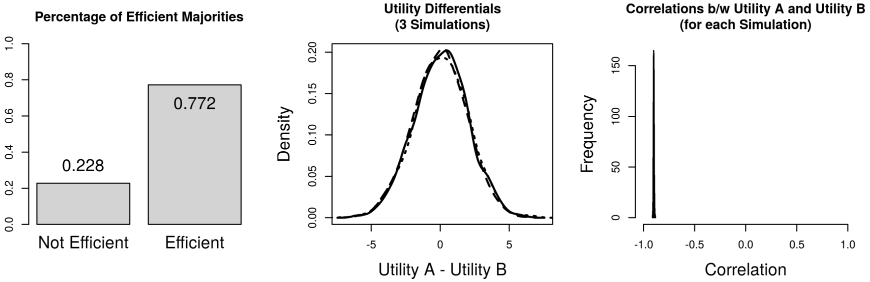


Figure: Negatively correlated utilities

$$\mathbf{U}_i \sim \mathcal{N}\left(\mu = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \mathbf{\Sigma} = \begin{pmatrix} 1 & -0.9 \\ -0.9 & 1 \end{pmatrix}\right)$$

Study 5: Inefficiencies with Spatial Utilities I

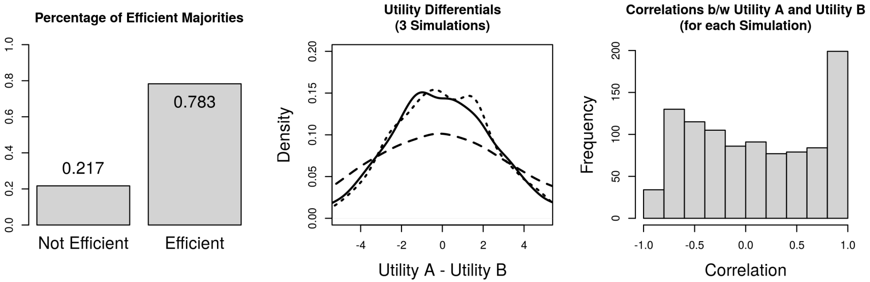


Figure: Symmetric policy positions

$$V_i, P_A \sim \mathcal{N}(\mu = 0, \sigma^2 = 1) \qquad P_B = -1 * P_A$$

$$U_{ij} = -(V_i - P_j)^2$$

Study 5: Inefficiencies with Spatial Utilities II

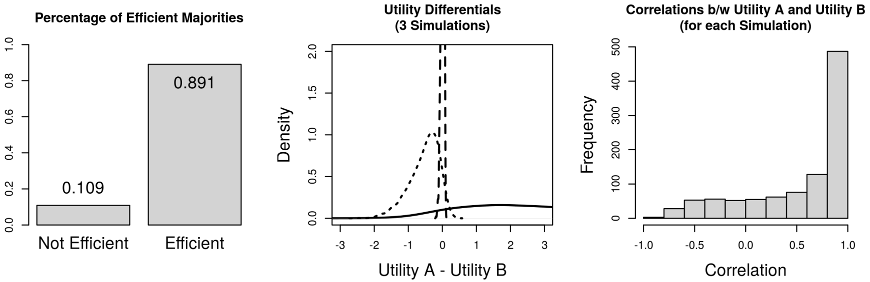


Figure: Skewed ideal points

$$V_i \sim \mathcal{N}_{\text{skew}}(\mu = 0, \sigma^2 = 1, \gamma = .85) \qquad P_j \sim \mathcal{N}(\mu = 0, \sigma^2 = 1)$$

$$U_{ij} = -(V_i - P_j)^2$$

References

Downs, Anthony. 1957. *An economic theory of democracy*. New York.

Enelow, James M and Melvin J Hinich. 1984. *The spatial theory of voting: An introduction*. CUP Archive.