

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

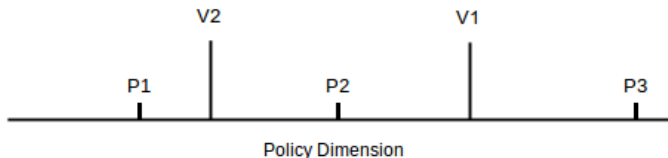
	Policy 1	Policy 2
Voter 1	10	100
Voter 2	110	100
Voter 3	110	100

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; ?):
 - ▶ 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 II

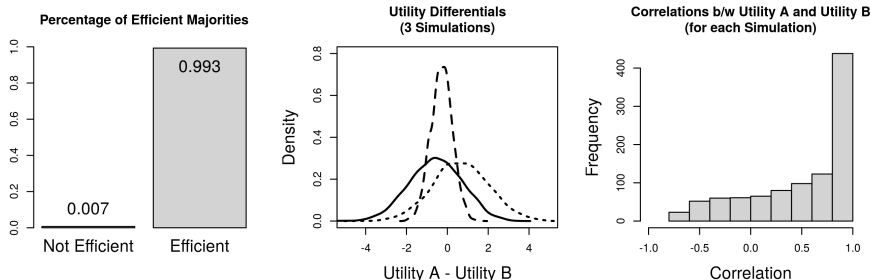
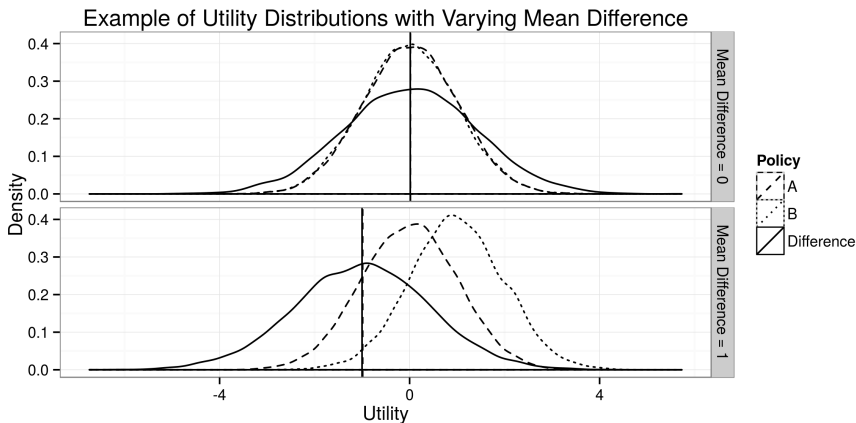


Figure: Spatial preferences

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

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

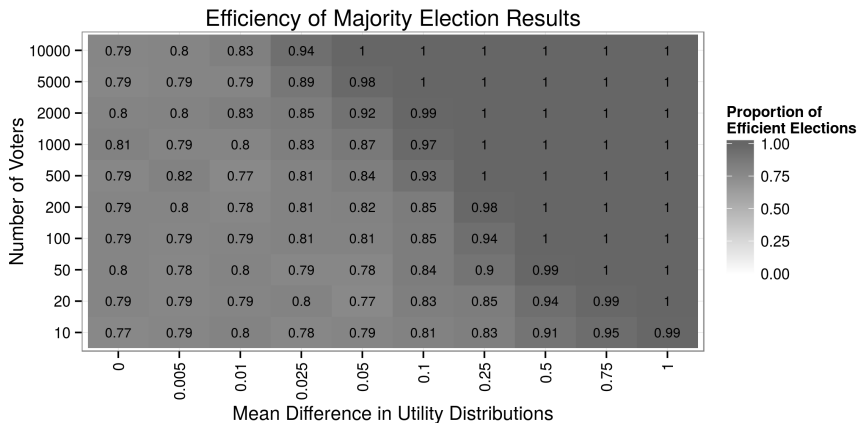
Study 3: Mean Differences in Policy Utilities I



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

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

Study 3: Mean Differences in Policy Utilities II

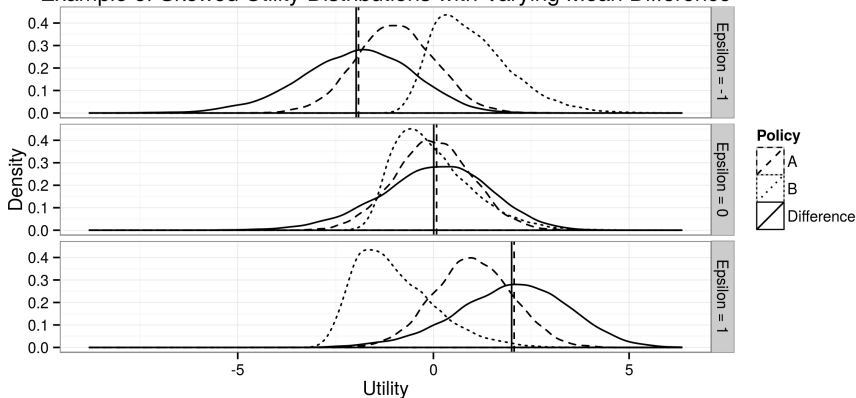


$$U_{i,A} \sim \mathcal{N}(\mu = 0, \sigma^2 = 1)$$

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

Study 4: Skewed Policy Utilities I

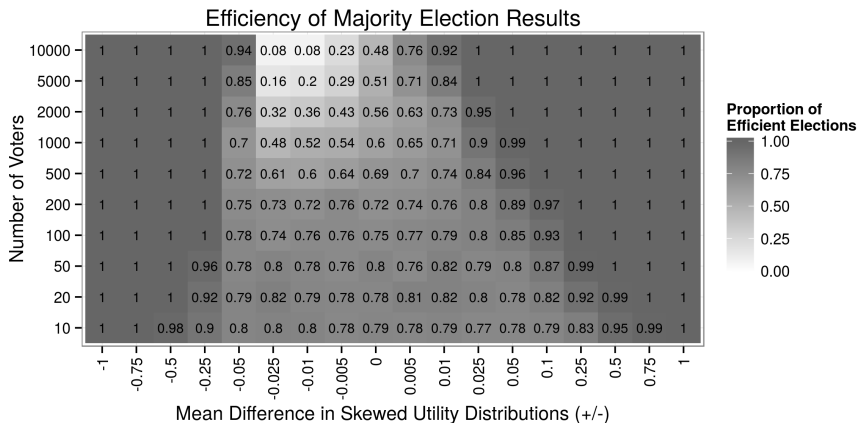
Example of Skewed Utility Distributions with Varying Mean Difference



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

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

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

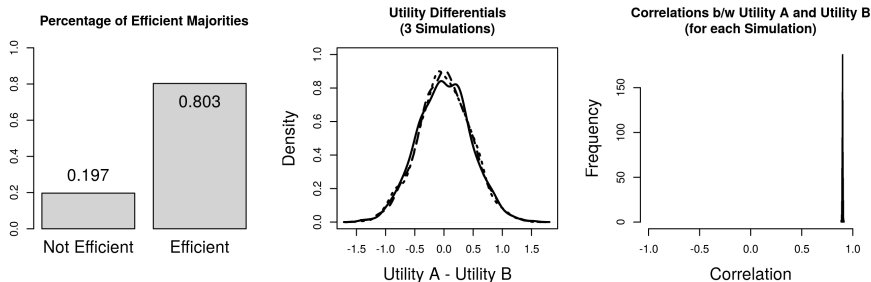


Figure: Positively correlated utilities

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

Study 2: Correlated Policy Utilities II

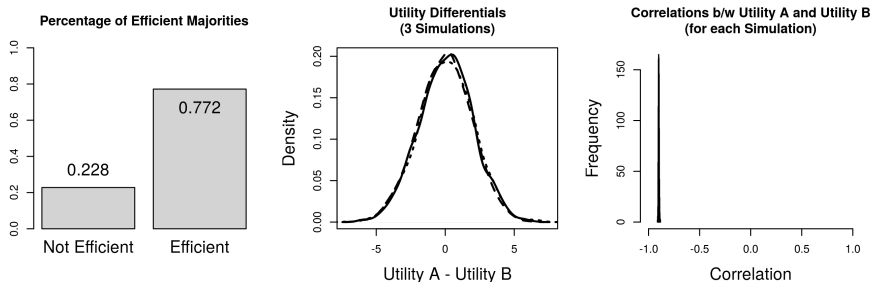


Figure: Negatively correlated utilities

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

Study 5: Inefficiencies with Spatial Utilities I

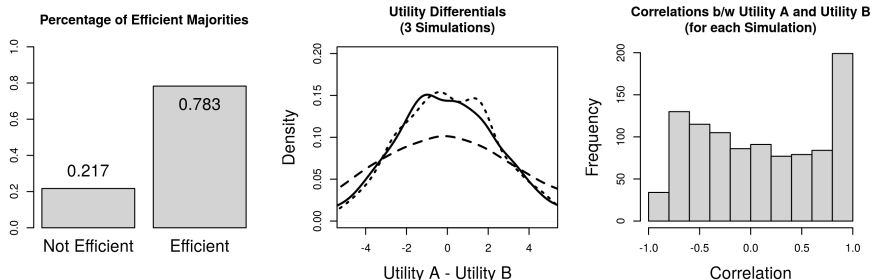


Figure: Symmetric policy positions

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

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

Study 5: Inefficiencies with Spatial Utilities II

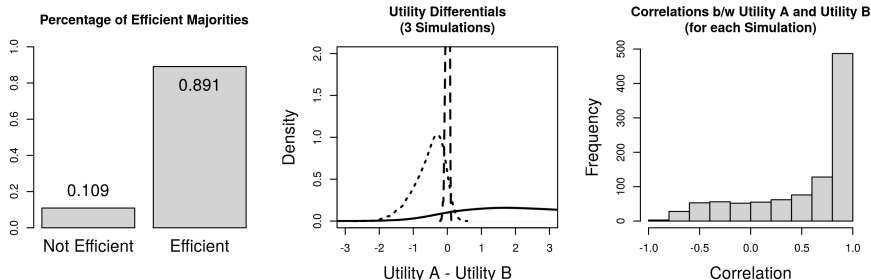


Figure: Skewed ideal points

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

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

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.